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DENTAL COLLEGES IN RELATION TO THE TEACHING AND PRACTICE OF ORTHODONTIA

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THE field presented by the title is very large, as may be readily seen upon a moment's reflection. It will not, therefore, be the purpose of the writer to discuss in the fullest details all that might be considered, and under such circumstances it should be recognized at the outset that a nicely connected logical discussion is well nigh impossible.

The subject to be discussed is of such wide scope that even a brief consideration will be lengthy—perhaps too lengthy for the vast majority of dental practitioners, for it is well known that most practitioners are more interested in short-cut, easy methods, leading to certain success, which all experienced, observing and conscientious orthodontists well know are not to be found in this branch of dentistry. Many of the features to be presented will therefore be brief—perhaps too brief to be sufficiently comprehended, or may even appear irrelevant.

There are certain questions relative to the practice of orthodontia, and the teaching of this subject in dental colleges, that well merit consideration, since there is some misconception regarding the relation of the one to the other.

Before attempting to discuss the question of education, we should first analyze the status of orthodontic practice and the requirements of service to the afflicted. In this way some light may be thrown upon the subject which will better enable us to reach a solution of the problem of education. For one to arise and declare more or less dogmatically, that this or that must not be done, or, that it must be done thus and so and not otherwise, simply because mistakes were sometimes made in the past when not done "thus and so," is not conclusive argument to sustain the declaration. Were the "thus and so" always perfectly

obvious, free from doubt as to ultimate success, free from other complications which might be even greater than the original affliction,—not simply in one or two respects, but in all respects; were there no material factors or circumstances involved in different cases entirely beyond the mere operative skill and technical understanding of the dentist or orthodontist; were there no differences of opinion among those who sit in authority, then the arguments might be considered closed, the case proved, and the verdict accepted without appeal. Unfortunately, however, this utopian state is not yet at hand, and what is even more unfortunate, the obstacles to be surmounted are such that it appears highly improbable that this state will soon be attained. While there are some problems in dentistry in which the course of treatment in certain respects is inflexibly established, from which there can be no deviation, it does not follow that such inflexibility can be applied to all of our problems.

Since orthodontia is practiced very largely as a specialty, some contend that the regular dental student should not devote any time to clinical work in this subject, because at best he cannot become sufficiently skilled to treat malocclusions of the teeth successfully in the general practice of dentistry, and that as a rule he does more harm than good when he attempts it. This is a somewhat sweeping charge, and in the opinion of the writer cannot be sustained if it is meant to convey the idea that the dentist of the future can do no better than the dentist of the past.

We may here inquire into the causes of the dentist's failure in the practice of orthodontia in the past, whereupon it will be found that there are many. First may be mentioned an inadequate conception of the evils of malocclusion. In the past the treatment of malocclusion has been looked upon more in the light of a luxury than a necessity, the principal evil having been considered the injury to appearance. While other evils were recognized, yet they were not generally considered serious. Even at the present time there is more or less diversity of opinion regarding the evils of malocclusion, one authority having recently stated that the most important reason for correcting malocclusion is that mastication may be properly performed.

Not until the general practitioner appreciates more fully the evils accompanying, or resulting from malocclusion, can he be expected to do his part with that vigor and intelligence which is so essential in the successful practice of orthodontia. There are too many dentists whose conception of orthodontic practice lies principally in finding some simple, easily applied and easily operated appliance that will insure successful results;—a will-o'-the-wisp for which the orthodontist is not entirely blameless.

Some of our orthodontists are interested in the manufacture and sale of regulating appliances, which may explain why we sometimes find enthusiasm over appliances and the ease with which results are obtained, carried to such extremes that the dentist is actually misled into believing that the correction of malocclusion is a simple matter if one has a good regulating appliance. One can hardly attend a dental meeting without finding exhibitions—by orthodontists—of wonderful appliances that make treatment of malocclusion a simple and easy matter. This undoubtedly has been largely responsible for the shortcomings—or failure if you please—of the dentist's work in orthodontia.

Instead of showing the dentist that orthodontia is very easy, it would be

far better to show him that it is very difficult, though not so difficult as to be entirely out of his reach. He should be brought to realize that this is a subject for continuous study and work, and cannot be successfully carried on by any process of mere rote or imitation; in this event he will first learn that he must begin his work under different auspices than has been customary.

We must constantly keep in mind, however, that the problem before us is an intricate one, which cannot be solved by considering any one point alone. Since there are many points, and scarcely one that is settled beyond reasonable debate, it will be seen that the issues must admit the personal equation, and consideration of possible exigencies of the case in hand, besides the patient's wishes. No absolutely inflexible law can be laid down to apply alike in all cases regardless of everything else. Again, we must not allow this sweeping generality to cover up ignorance,—gross ignorance, even though it is sometimes difficult to determine what constitutes ignorance, as may be seen "when doctors disagree."

All cases should be considered upon their individual merits, and when the dentist meets with cases where departure from well established principles seems to be indicated, he should avail himself of the counsel of an experienced orthodontist.

When the dentist believes, as most of them do, that the principal evils of malocclusion are injury to appearance, impairment of mastication, and danger of caries, he is not properly equipped for wise, vigorous, and efficient counsel, which in turn plays such an important part in the treatment of malocclusion, by enlisting that thorough cooperation of the patient, so essential to successful practice.

While these evils are potent and demand earnest consideration, they are not the worst, or most harmful features of malocclusion; this will be given further consideration hereafter. It may not at once be apparent just how consideration of the evils of malocclusion can have any material bearing upon the elimination of the bungling work or incompetency of the dentist, as is charged, in his attempts to treat malocclusion. As has already been indicated, there are many factors that enter into the problem under discussion; this is only one of them, but it is more important than might at first appear.

One of the very important factors entering into the successful practice of orthodontia, is that the way be properly paved in beginning the treatment. Unless the patient also appreciates fully the evils of malocclusion and the essentials underlying successful treatment, he will not be very likely to contribute full cooperation, and without this, success in the fullest measure can not be expected. Thus it falls upon the dentist to properly advise his patient regarding the evils of malocclusion, and what is essential in the treatment thereof, in order to get that full cooperation which is necessary for entire success.

It should be understood that full cooperation means more than merely keeping appointments, though this is frequently carelessly observed and gives rise to much trouble;—means more than allowing appliances to be placed upon the teeth, though this, too, is often interfered with, and, as the orthodontist knows, this is not conducive to success.

Full cooperation includes many features, among which necessarily is the important one of such reimbursement to the dentist that he need not feel that he is making sacrifices beyond his limitations in carrying on the treatment. Failure

in this feature alone is in no small measure responsible for the shortcomings of the dentist in treating malocclusion. It may not be amiss to state here that in all probability most of the deficiencies or faults found in the general practice of dentistry can actually be attributed to this cause, instead of ignorance as is commonly done. Good service in any branch of dentistry requires painstaking efforts and more time, in addition to skill and understanding.

Another cause of failure in the treatment of malocclusion by the dentist is due to the fact that treatment until quite recently was not well established, neither as to what ought to be done, nor the means by which it might be accomplished. Not only were there no well established principles of practice in the past, but even now we find differences of opinion among those whose opinions are entitled to consideration, differences upon important points. Some of our leading specialists might also concede that not all of their work has proven entirely successful.

If the contentions here set forth are admitted, then it must be readily seen that the culpability of the dentist, as has been charged, is not without some extenuating circumstances, and he should not, therefore, be immediately decapitated, at least not without some further careful consideration.

Before proceeding further, it may well be asked here what are the specific charges against the dentist's practice of orthodontia? In general it is held that he does not correct malocclusion, and therefore his work is a failure. It is also claimed that the dentist extracts teeth in attempting to correct malocclusion, thus, on the whole, it is maintained that he does more harm than good.

If by failure is meant that the dentist does not obtain ideal results, the charge is undoubtedly justified in many cases. But this, however, cannot be interpreted that the orthodontist would secure ideal results in all cases, unless it is assumed that the orthodontist would not undertake treatment where, for any reason whatever, ideal results could not be obtained. This raises a very serious question upon which even specialists are at variance. To obtain ideal results in the treatment of all cases of malocclusion, frequently involves great difficulties, in which the patient for various reasons cannot fully perform his part, and in addition, there is the danger that serious consequences may follow in many cases where teeth must be restored by bridge-work, whereby pulp devitalization may ensue in the attempt to establish ideal occlusion.

Until it is thoroughly established that the treatment of malocclusion should never be undertaken unless ideal results are obtained, the charge against the dentist upon this ground is not sustained. Moreover, the establishment of ideal occlusion does not guarantee permanency of results, the claim of certain specialists to the contrary notwithstanding, and permanency of results must always be the ultimate measure of success.

In discussing these problems, it can avail but little if the considerations are limited to only favorable types of malocclusion in which ideal results are readily obtainable.

Until we have a higher standard of education, not only of the dentist, but of the public as well, there will be many cases of malocclusion which will present more than ordinary difficulties, owing to neglect of the teeth, both temporary and permanent, and frequently to extraction.

The public should be taught to understand and appreciate good dental serv-

ice, though this alone will not be sufficient. The education of the public must include the great problems of economics. Society as organized at present does not permit more than a favored few obtaining the best that can be done in all that is essential to human welfare. Only a small percentage of our population—estimated at about twelve per cent—at present receive dental treatment other than extraction and artificial dentures.

Regarding the extraction of teeth as a corrective measure, it must be admitted that harm has been done, but it should be observed that this is an evil confined very largely to the past, when the principles of practice were not as well established as they are now. It is very doubtful whether this charge will be preferred against the younger generation of dental practitioners whose college training has been what it should be; not, however, that there will never be found a case where ignorance or bad judgment has been shown, for not until the great millennium is reached in which no evil, pain or unhappiness is found, may we expect this. The prudent dentist of little experience will seek counsel before he decides upon extraction. The question of extraction in mutilated cases, which are frequently found,—cases having previously suffered extraction—is by no means one of a single idea. In this connection it may be stated that it is quite within the range of possibility that the nonextracting orthodontist has done even greater harm in his zeal to obtain ideal occlusion in cases where teeth were missing, by resorting to bridge-work and thereby causing devitalization of pulps. As is generally well known the devitalization of pulps is now regarded as a much more serious matter than it has been in the past.

We may now inquire whether it is desirable or necessary for the dentist to treat malocclusion of the teeth, in view of the fact that the successful practice of this branch of dentistry presents many difficulties for any other than the specially trained orthodontist. It must be admitted that the treatment of malocclusion of the teeth considered in its entirety, with the multitudinous complications that may be encountered, demands great skill and understanding, which unquestionably cannot be attained to the fullest extent by the general practitioner of dentistry under ordinary circumstances.

Since malocclusion needs treatment, however, wherever it may be found, and as specialists cannot be located in every community that will support only one or two dentists, it is clearly evident that many who are afflicted with malocclusion must be denied treatment if the local dentist does not practice orthodontia. Only the large cities afford a field for the orthodontist, and as more than one-half of our population lives outside of the large cities, it is obvious that many could not receive treatment if the dentist does not give it. This, it appears, shows conclusively that the dentist must practice orthodontia. Could malocclusion be treated similarly to the removal of adenoids, then it might be maintained, for reasons that are obvious, that none other than the specialist should attempt the treatment.

There now remains to be considered whether the dentist can become sufficiently proficient in this branch of dentistry to enable him to practice it with reasonable assurances of success. It has been admitted that the dentist of the past has not done as well as he should, in fact, has done harm in some instances. It has also been shown in part why he has failed. To pursue this investigation further, it should be borne in mind as was heretofore indicated, that there are

many causes for his failures; that the channels through which they operate are diverse and some very indirect, so that potent causes may be lost to view. Only by seriously and serenely viewing all of the evidence, pro and con, with an earnest desire to know the whole truth, may we hope to find the true perspective. Many of our problems throughout dentistry are viewed from too narrow a standpoint, even by those often-times who are competent to speak with authority.

In the light of our present knowledge and understanding, it is not easy to appreciate fully the difficulties of the past regarding the practice of orthodontia by the dentist, owing to the chaotic condition of the principles and the practice that have existed. And when we stop to consider that at the present time there are some so-called specialists,—who meet the popular requirements of the term, namely, devoting their entire time to this branch of dentistry—that are practicing orthodontia with little or no regard whatever for correct occlusion of the teeth, it is not at all strange that the dentist's work in orthodontia is subjected to criticism. Obviously, the situation will not be clarified by turning this branch of dentistry over to the specialists as we find them today.

To return now to the inquiry as to why the dentist has not succeeded in the practice of orthodontia, we will refer again to the lack of appreciation of the evils of malocclusion which in turn brings up his education. The dentist has been educated to believe that the greatest evils of malocclusion are injury to appearance, impairment of mastication, and danger of caries. This is not only wholly insufficient to impress patients in many instances with what is actually necessary for successful treatment, but the dentist himself is not equipped for successful practice if he does not realize that there are greater evils. Anything that is injurious to the patient must be fully appreciated by him before he will seek and receive treatment; or in other words, before a patient will submit to treatment, especially if it involves him greatly, such as pain, inconvenience, great expense, many visits, long period of treatment, etc., he must realize fully the evil of his affliction, otherwise he will decline treatment or seek only that which appeals to him. With only partial appreciation of the evil and what is essential to treatment, the patient will frequently strive to obtain only such treatment as appears reasonable to him, and this with the faulty understanding of the dentist, naturally spells failure.

Injury to the appearance is generally the principal one in which the patient feels concerned, and this is usually observed only when the upper anterior teeth are noticeably malposed, consequently he requests correction of only that which he sees, and when the dentist with his limited knowledge attempts to comply with the request, the result is usually failure. Malocclusion that does not mar appearances noticeably will usually go unheeded by the patient, unless convincing argument is presented to him showing that there are other very important reasons for treatment.

Impairment of mastication will rarely appeal to the patient as a sufficient cause for treatment, unless very pronounced malocclusion is present, in which it may be readily seen that injury to digestion and nutrition may follow. Furthermore, excepting very marked malocclusion, the dentist himself in all probability has little faith that mastication is often impaired to such an extent as to actually injure digestion and nutrition. That mastication is frequently not prop-

erly performed is admitted by all, but this is oftener due to bad habits or haste rather than a perceptibly defective masticatory apparatus.

As to the danger of caries it may also be said that it does not always accompany malocclusion, though it must be admitted that caries is favored by malocclusion; this of course will depend somewhat upon the character of the malocclusion. All have seen cases of faulty proximate contacts due to malocclusion and yet no caries was found up to thirty, forty or even fifty years of age, while in other cases where the proximate contacts are normal, caries is often found in early youth. The writer does not mean to imply hereby that malocclusion does not favor caries, but there are other causes of caries that are much more cogent, with reference to which there is need for much more concern than is now shown by either dentist or patient.

It is not the intention of the writer to minimize in the least the evils of malocclusion as mentioned, but there are greater evils that should be better recognized and emphasized in order that both dentist and patient may more fully appreciate the necessity for correcting malocclusion, and that the term "correcting malocclusion" may be interpreted with greater exactness so that reasonable assurance of full success may be expected.

Only in this way will there be probability of such cooperation as is essential, and that nothing will be left undone which is necessary for success. Attention may again be directed, however, that at no time can we lose sight of the fact, as already stated, that even when the fullest correction of malocclusion has been made, the good results obtained may not be permanent in every case. Even those who have had much experience in the treatment of malocclusion will acknowledge—very reluctantly sometimes—that results obtained at the time of completion of treatment are not always permanent.

Greater evils of malocclusion are, injury to the attachments of the teeth, and injury to the positions of other teeth, or in other words as regards the latter, malocclusion begets malocclusion—malocclusion becomes intensified.

These evils are not new or hitherto unknown. They have long been known, but they have not been sufficiently appreciated by the dentist, in consequence of which patients have not been earnestly and well advised.

Injury to the attachment of the teeth as a result of malocclusion is finding recognition in some other respects in the practice of dentistry. Dr. Forrest H. Orton, the well-known authority upon crown and bridge-work, has recently stated that he considers occlusion the most important feature of that branch of dentistry. This is a most remarkable statement, in view of the fact that Orton has arraigned that branch of dentistry more severely than any other exponent, upon the grounds of faulty root preparation and faulty contours of crowns, though now he holds that faulty occlusion is the greatest evil. By faulty occlusion, Orton means particularly malocclusion, which results in injury to the attachment of the teeth involved. Talbot many years ago directed attention to the injury being done to the attachment of the teeth and alveolar process by crown and bridge-work. Case also showed several years ago that the treatment of pyorrhea is aided by, correcting malocclusion. Bonwill in his days of enthusiasm over his anatomical articulator said that he "cured pyorrhea with his articulator," which of course elicited laughter, but those who knew Bonwill were well aware that it was not for mirth that the statement was made, for he

was an earnest, energetic worker whose experience and observation had proven to him the truth of his statement.

If the attachment of the teeth is injured by malocclusion, as has been noted by many careful observers, and gives rise eventually to pyorrhea, it seems needless to dwell upon this, for the seriousness of this disease is now well known. Surely nothing associated with malocclusion can be worse than the ultimate loss of the teeth by pyorrhea, which in turn is now also quite generally believed to be frequently responsible for serious systemic disease. Pyorrhea specialists recognize the futility of their treatment when malocclusion is present, without correcting the malocclusion.

That malocclusion begets malocclusion is an axiomatic truth that stands in marked contradistinction to "nature correcting malocclusion." Who can estimate the harm that has been done and the increased difficulties that have resulted from the advice "wait and see what nature will do"? During the developmental stage it is sometimes observed that nature assists somewhat in diminishing malocclusion, but this has been proven in many cases to be a dangerous precept. Sometimes a malocclusion appears insignificant or may even escape detection by the general practitioner, and later it gives rise to quite pronounced irregularity, as every orthodontist who has had much experience and has been a careful observer can testify. Even patients sometimes observe that unsightly malocclusion has appeared in their mouths after the age of youth when—as they supposed—there was no malocclusion before. Dentists have shown their ignorance by questioning such statements, believing that the patient had simply failed to notice the irregularity before. True in such cases malocclusion was present earlier in life, but it was not of such form as to attract attention; as time proceeded, however, it increased until finally it did attract attention.

The most lamentable feature of this is that the dentist also has failed so often to notice malocclusion in earlier life. Too many dentists do not notice or recognize malocclusion any better than their patients. In fact, I have known in numerous instances that the patient first discovered malocclusion in his mouth and then brought it to the attention of the dentist; this has occurred in cases where the patient has been regularly under the care of the dentist.

In view of these observations, it seems strange that orthodontists and dentists have not attached greater significance to these evils, for their importance appears to be self-evident, and since the dentist depends upon the orthodontist for all that is essential to the successful practice of orthodontia, it must be admitted that he is not altogether to blame for his shortcomings in the treatment of malocclusion of the teeth.

It is the writer's firm conviction, that upon careful analysis it will be found that failure in appreciating more fully these evils, has in a large measure been responsible for the most frequent shortcomings of orthodontic practice by the dentist, both directly and indirectly. If the dentist appreciated more fully these evils he would make more strenuous efforts to have his patients understand and appreciate them also, whereupon they would be more likely to heed the advice given them and make greater efforts to lend their full cooperation, which in turn would tend to greater success. In such event the dentist would not consider short-cut or makeshift treatment, and if the patient had better understanding he would be far less likely to request or insist upon such treatment.

However, as was previously noted, the poor results seen in the treatment of malocclusion by the dentist are not always due entirely to ignorance on the part of the dentist or lack of understanding and appreciation on the part of the patient. It is that unfortunate state of society which renders so many people unable to procure the best dental services owing to financial limitations, that is in a large measure responsible for the poor services rendered, not alone in orthodontia but in all branches of dentistry. I am well aware that this phase of the problem when presented for consideration is frequently decried, even treated with scorn and contempt by some who have either never had this to contend with, or they have long since found more lucrative fields and have forgotten about it. Nevertheless, the problem is a real one, and it is serious. It cannot be disposed of as some are wont to do, by a mere wave of the hand with an air of superiority, and simply crying out to "prepare"—and "qualify;" and "give"—"give the best there is in you;" "that he who is well qualified will never have any difficulty in obtaining compensation proportionate to his worth," etc. He who refuses to recognize this unfortunate state of affairs need not be expected to render material aid in overcoming one of the greatest obstacles to the performance of the best services throughout the entire field of dental practice. It can safely be said without fear of successful contradiction, that not until this obstacle is overcome can we expect the best to always be done in any branch of dentistry, but particularly in orthodontia in which the sacrifices called for on the part of the dentist would frequently be so great that he must either decline to render any service whatever, when the fee obtainable is wholly inadequate for the best service, or yield to the temptation of trying to relieve his patient as best he can, for such compensation as he may be able to obtain, and thereby subject himself to the criticisms of the idealist.

When the dentist attempts to treat a case of malocclusion for \$50.00—even this is a prohibitive fee for many patients—for which the orthodontist under very conservative consideration would require at least five times as much, it may readily be seen that someone must suffer. The dentist may bear such a burden once or twice before he decides that it is not a part of his duty to carry so much of his patient's misfortune, when he will conclude—and not without justification—either to refuse treatment entirely, or compromise and do the best he can for the pittance obtainable.

The importance of fees and the business side in general, in connection with the practice of orthodontia, is recognized by at least one of our educational institutions, where it is treated as a special branch of education under the head of economics.

The effect of this cannot be otherwise than wholesome, and it would be well if similar education were given in all dental colleges regarding all branches of dentistry, for, as previously indicated, it will be seen—eventually if not now—that a very large portion of the poor dentistry found, is directly due to low fees, which in turn is at least partly due—directly or indirectly—to a misguided spirit of philanthropy shown here and there by some of our prominent men as representing true professional spirit.

Dentistry of higher grade cannot be expected without compensatory fees. Higher education of the dentist alone will not insure higher quality of dental practice, for, as already indicated and as is generally well known, superior work

of any kind requires more time and time represents the dentist's earning power. The dentist does not seek riches as a rule, but even if he did, it is well known that there are exceedingly few who have amassed wealth in the practice of dentistry, assuming that by wealth is meant something beyond a modest home and such things as are necessary for a respectable living,—surely no one should deny the dentist such possessions.

In trying to imitate the medical profession, by which we are often well swayed, we must be very careful of our premises when making comparisons. The highly educated medical man requires no more time to write his prescription than does the one of lesser learning; the highly trained surgeon requires no more time to perform an operation than does he who has not been so well educated. Not so in dentistry, however, where as we well know, the better service requires greater technic and more painstaking which means more time—vastly more time. Were the difference in time between the best service and that which is poor, only a few minutes, then there could be no defense for the poor service; but when the difference in time is measured by hours, it becomes a matter of serious consideration. Even in so simple a service as cleaning teeth—which by the way is not such a simple matter as many patients have been led to believe, especially in cases where the teeth have not been previously well cared for by both patient and dentist—the time required may be several hours and necessitate several visits, yet ordinarily it is regarded as “simply cleaning teeth.” A sermon upon this alone, or several of them since one will not accomplish much, is urgently needed by both the public and the dentist. Every thoughtful and carefully observing dentist well knows that this is a very important service, and he knows too that it is one of the most common, shabbily performed services rendered by the practitioner, yet we rarely hear a real plaintive note as is heard about other features of dental practice. Can anyone compute—in the light of our present understanding of the evils of pyorrhea—the amount of injury suffered by our patients because of the carelessness shown in this “simply cleaning teeth?” The two principal causes of this are first, lack of appreciation on the part of the public that the teeth are really of vital importance in the general economy, believing as they do that they do not involve life and death. In consequence of this comes the second cause in that the dentist finds it difficult to obtain proper remuneration for the best service in cleaning the teeth, and so frequently too he finds that the patient does not cooperate by doing his part in caring for his teeth; the well-known result naturally follows therefore.

To remedy this, as well as many other defects of dentistry, a campaign of public education is necessary, for it cannot be accomplished by the dentist individually. This is a matter to be taken up in good earnest by our dental societies.

It is highly important that the public be educated regarding dentistry in general, in which orthodontia should be included. An educational campaign should be carried on to overcome the evil influence exerted by the deception, and the misleading information placed before the public daily, by charlatans using the daily press. The pernicious effect of this baneful influence is greater and farther reaching than is generally realized, and is not confined to the locality where such publication appears. Many young practitioners are gradually led to lower standards of dental practice, frequently more or less unconsciously, because this evil influence is so great that they cannot escape it entirely;—operations and

treatments are hurried along because the dentist keenly feels that he cannot afford to spend the time necessary for perfect work for the fee he can get. While there are many causes for the low standard of fees, the one here mentioned is undoubtedly the most potent.

There are of course a few practitioners who do not suffer appreciably from these causes, consequently they are not as a rule competent to speak upon this point, though not infrequently they essay to do so. Upon careful examination, however, it will be found that a very large percentage of dental practitioners do so suffer, or rather would suffer, if they did not throw the burden upon their patients. Thus, in the end it is the patient that is the sufferer, and, therefore, it is the public that needs education even more than the dentist, since education of the dentist alone cannot possibly overcome this difficulty, unless some means is found whereby perfect services may be rendered in very much shorter time than is now possible.

The writer is not unmindful of the fact that there are some practitioners who receive ample fees, yet render poor service, but it is not intended to discuss here all the evils of practice and attempt to prescribe remedies therefor. It is only because we find so frequently, that the poor dentistry so often seen, is attributed to poor education of the dentist—which undoubtedly is not infrequently the case—that this question is brought into the discussion. Upon careful analysis it will become perfectly obvious that there are other potent causes for poor dentistry than simply faulty education of the dentist.

It may not be amiss here to allude to those phenomenal practitioners to whom anything less than perfect operations or perfect treatments in all cases is apparently unknown, and who therefore would have it appear that every practitioner should and may do likewise. Even if it be admitted that there are some practitioners who are so far superior to others that perfection marks every service they render, there probably will be found no others who are willing to say that all may reach such lofty heights. And when such heights are not reached, who shall say, and what shall be the standard of measure as to the shortcomings allowable? It is said that "one extreme is as bad as another," and this may not be altogether inapplicable here, though of course all will agree that all efforts should be bent towards perfection, but, to attain this, however, we cannot fail to take cognizance of every factor that militates against such end.

When it is recalled that for many years now, not only must the dentist have had college training, but he must also pass inspection by state examining boards as to his qualifications (here the writer hears "no stream can rise higher than its source," but upon more than one occasion such crier's own work has been known not to warrant turning on the searchlight), and since he cannot practice dentistry without having demonstrated his proficiency, it ought to be very strong evidence that there is something besides faulty training of the dentist that is responsible for poor dentistry; yet the cry continues, "poor dental training." Not that the writer is content with present dental training, for he will yield to no one a keener appreciation of the need for better education—and in this connection the question might well be asked, what constitutes better preparation of the dentist?—but it is so evident that there are greater causes for poor dentistry than present education of the dentist alone, which if not recognized and corrected will

result in a continuation of faulty dental practice even though dental education be increased to four years as is now taking place.

If there were nothing other than poor dental training that is responsible for the poor dental practice so frequently seen, it should be self-evident that the practitioner must either improve or retire, for the law of survival may safely be presumed to operate here as elsewhere. Many well know that it is the unfit—judging by the work done—that frequently survives longest in dental practice. Moreover, it may be frequently observed that the dentist not only does not improve but actually fails to do as well as he did in college or as well as he demonstrated to the examining board, simply because he finds that the public does not appreciate fully what the best in dentistry implies upon its part, and that it is exceedingly difficult, often utterly hopeless, to develop such appreciation and understanding. This lack of appreciation, however, is, as elsewhere noted, undoubtedly due in many instances to economic reasons over which many have little or no control.

To educate the public individually by the dentist, as is often advised by some who assume to speak with authority, is exceedingly slow, inefficient, and expensive to the dentist, as many can testify who know from experience. Who among earnest practitioners of considerable experience has not found time and time again, after spending much valuable time advising patients in one particular or another, that it is not comprehended, or appreciated; that ulterior motives are interpreted, or that the whole is promptly forgotten.

It is the writer's firm conviction that one of the most important steps in the advancement of dental practice will be found in education of the public, whereby the people may be enabled to understand and appreciate the difference between good and poor dental service. Another obstacle in this connection is that at the present time there are entirely too many people whose chief concern regarding their teeth seems to be limited to pride and convenience, who seem to feel that that scriptural injunction about plucking out the offending eye may be applied with impunity to the teeth. But in the light of recent developments regarding bodily welfare as related to pathologic conditions of the mouth, it is highly probable that people will feel more concern about their teeth in the near future especially if they are properly enlightened.

If an object lesson is needed regarding the efficiency of public education, it may be found in the rapidity with which the public became informed and interested—whether with material benefit or not is another question—in the emetine treatment for pyorrhea. I dare say that some people learned of this before their dentist did.

With the awakening of the medical profession regarding the possibilities of disease of the teeth and mouth and the treatment thereof along with an efficient campaign of public education, we may accept as a foregone conclusion that the public will promptly become more discriminating in seeking dental services, and then may we hope to see the standards of dental practice rise, which will be further assisted by better education of the dentist as a result of increased time and greater intensity of purpose.

In summarizing, it appears conclusive that the dentist should practice orthodontia, and therefore his education must prepare him as well as possible. While education in this branch of dentistry has been inadequate as conducted

in dental colleges in the past, the same may be said of other branches of dentistry. It is for these reasons that the dental course has been extended to four years which will therefore permit better preparation in all branches in the future.

Education in orthodontia, however, has not been as good in the past as it might have been, due to various reasons;—first, the student was not sufficiently impressed with the importance of the subject—the evils of malocclusion and the necessity for treatment—in consequence of which he did not feel sufficiently interested to avail himself to the fullest extent of such educational opportunities as were presented. It was not uncommon for students to remark that they did not care for orthodontia—that they did not intend to practice it—that people were not sufficiently interested to have the work done—that they would send their cases to a specialist—that all they cared for was to pass the chair, etc. Second, for many years there were no well established principles of practice, and even now there are differences of opinion regarding fundamentals, consequently it was impossible for the teacher to lay out a definite, tangible, well connected course whereby the student could gain a working knowledge sufficient as a foundation to build upon; under such conditions too it was with difficulty that a student's interest could be aroused. Furthermore, the teacher also recognized that the student lacked interest, and that there was insufficient time for proper training, besides the probability that there would be little call for this work in the young dentist's practice, therefore he too lacked enthusiasm and carried on his work in a more or less perfunctory manner. Then, too, the public in the past knew very little of the possibilities or needs of treatment of malocclusion, and for many years injury to appearance was regarded the principal evil; if the patient did not ask for treatment the dentist usually did not suggest it.

Thus it may readily be seen why the practice of orthodontia by dentists educated several years ago, among which may be included some of comparatively recent education, is the object of criticism at the present time; in addition, the dentist is now censurable for sins of omission as well as those of commission, as is found in his frequent failure to promptly recognize malocclusion in its incipency, when under proper advice and treatment it might be avoided or greatly mitigated.

There has been marked advancement in the theory and practice of orthodontia, and the public has also been educated somewhat to know something of the possibilities and the necessities of treatment in this branch of dentistry, thus the conditions for education and practice are more favorable than they were in the past. There are, as previously shown, some deficiencies and some obstacles yet to be overcome before this branch of dentistry can occupy its place in general practice without much criticism; but as already shown, there is no branch of dentistry that is not subjected to more or less criticism in general practice.

With a greater appreciation of the evils of malocclusion, and the causes that produce it, observing that these are much further reaching than has been properly recognized in the past, this subject becomes one of the most important in dentistry.

Pyorrhea or one of its incipient stages, one of the most common diseases of the mouth, is generally admitted to be invariably found sooner or later in malocclusion of the teeth, and in such cases the treatment of pyorrhea will not be successful without correction of the malocclusion.

In crown and bridgework we are told that faulty articulation, which, as previously shown means malocclusion, is the greatest evil in that field.

It has also been shown that malocclusion, which might hardly be noticed in youth, tends to intensification.

The dentist therefore expecting to reach the highest standards in the ordinary interpretation of the term dentistry, must of necessity be well informed and appreciate fully the subject of orthodontia. Orthodontia is no longer a mere luxury or an adjunct of vanity.

With a proper presentation of this subject to the student so that he may fully appreciate its importance, his indifference of the past will give way to the keenest interest, in which case it will be found that even under the present length of time he can acquire a much better understanding and working knowledge of the subject than he has done in the past. And with the addition of another year which is about to go into effect in the course of most dental colleges, the student should become sufficiently well grounded that he may treat malocclusion with a reasonable measure of success. The student should be taught that in difficult cases it will be well for him to seek counsel until his experience has been such that he may rely upon his own understanding. The young dentist should understand and feel that in no case is it a reflection or discredit to seek counsel from an experienced orthodontist when he meets with a case that is not entirely clear to him; on the contrary, it should be distinctly to his credit and inspire confidence in his patient.

This is not to say, however, that all dentists should treat malocclusion, for those who practice in the larger cities where orthodontists are available, may if they wish refer their cases of malocclusion to the specialist, which undoubtedly it will as a rule be well for them to do. Yet, for the dentist's education, a thorough course in orthodontia should not be omitted since he has a very important function to perform in general practice which may be spoken of as preventive orthodontia. With only partial training in orthodontia without intention to practice, there is great danger of the dentist not appreciating the subject sufficiently to insure that careful observation of children's teeth necessary to avoid the production of malocclusion, or to promptly recognize it and refer the case. Every orthodontist knows only too well that many cases of malocclusion might have been avoided or mitigated had the teeth been properly cared for from early childhood, or where malocclusion was inevitable had it been promptly recognized and the case taken in hand for treatment. In other words, the dentist frequently fails to observe malocclusion in its incipiency, and occasionally fails to notice quite pronounced malocclusion when it already exists and should easily be seen.

In conclusion it may be said that it appears clearly evident that the dental student, instead of having his education in orthodontia curtailed in any respect whatever, should have it extended, in order to prepare him not only for the practice of orthodontia where it is required and specialists are not available, but for the better practice of dentistry as well. Unless the student's training includes clinical work—which some who speak with authority say should be omitted because they believe that the dentist should not try to treat malocclusion—with a view to practicing orthodontia, he can scarcely be expected to feel and exercise that deep interest and keen foresight so essential to the best practice of general dentistry, particularly as regards the care of children's teeth in relation to

malocclusion; nor will he be likely to give vigorous and efficient counsel to his patients so that they may appreciate and heed his advice. And, as was shown, there will be many cases that cannot be sent to a specialist, consequently the dentist should be prepared to treat malocclusion.

With better appreciation of the evils of malocclusion, better appreciation of the necessity for treatment, better establishment of principles of practice, better understanding of the elements of successful practice, better education of the dentist as a result of deeper interest and extension of time, and better education of the public, there is good reason to believe that the general practitioner may become sufficiently well prepared to begin the practice of orthodontia and render services that will be beneficial to his patients, even though ideal results may not be obtained in every case.

Operating Room Illumination

VARIOUS medical journals have been discussing the question of the desirability of getting away from having everything white in operating rooms. Several surgeons have been experimenting with different colors, and one surgeon has gone so far as to have everything in black, even to the sheets and operating gowns. We are disposed to believe that it is a good plan to get away from the pure white, which is tiring to the eyes, and especially to do away with glazed surfaces which are very objectionable through reflection. Still it is quite unnecessary to go to the extreme and adopt black, which makes it necessary to increase the amount of artificial light in order to illuminate the field of operation as well as the surroundings; and we cannot quite agree that green, though restful to the eyes, is very much more desirable. There are, however, some of the soft shades of gray which are restful to the eyes, while at the same time giving an appearance of cleanliness and interfering but little with illumination. An operating room with walls, ceiling and floor in a soft tint of gray, and in the flat or dull finish so as to avoid reflection, makes an ideal color scheme which does not tire the eyes, and is all that could be desired from an esthetic point of view. If the surgeon desires to carry this still further he can have his gowns and coverings for the patient and tables in gray tints, though that is quite unnecessary.

Furthermore, it should be remembered that the question of illumination has much to do with comfort for the eyes of those who are obliged to be in operating rooms for any considerable length of time. Too much illumination is just as bad as too little illumination. The tendency to have an operating room lighted on two or more sides in addition to having a skylight, may prove objectionable if there is considerable sunlight or considerable reflection. The softest light is that from a northern exposure, and when it comes to artificial illumination, the powerful light from numerous high-power tungsten lamps is quite sufficient to tire even the strongest eyes. Theoretically, it is far better to have less light and have it properly directed and subdued than to be annoyed by the discomforts from undue brilliancy. In fact all of our ideas concerning illumination are undergoing a change and our efforts to secure uniform and sufficient illumination in our offices and residences by using indirect illumination are beginning to be used in operating rooms, and with no little success. Brilliancy of illumination does not mean possibilities for better work, and it does mean discomfort for the operator.—*Journal of the Indiana State Medical Association.*

THE EVOLUTION OF THE PRINCIPLES OF JACKSON APPLIANCES

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PART III.

Construction of Removable Jackson Appliances

PREPARATION OF MODELS.

INASMUCH as Jackson appliances are made over models by a process of off-hand construction and assembling of the parts, the casts should be perfect, and the greatest care should be given to preserving the anatomical outlines over which the parts are made.

The best assurance of perfect-fitting appliances is the use of models made only from plaster impressions. The model material should be the finest grade



Fig. 7.

of plaster of paris. If any of the very hard compositions of modeling material are used, or if the plaster of paris is boiled in stearine or paraffin, the possibility of exercising correct technic is lost.

Models should not only be made of plain plaster, but must be used moist. When the numerous parts are made over dry plaster surfaces, they have to be removed, set aside, and assembled when all parts are finished. By this plan the desired accuracy is lost because the construction is a progressive process of building one part upon another, from the first to the last, and if the parts first made are removed, it is impossible to make allowances for the subsequent parts

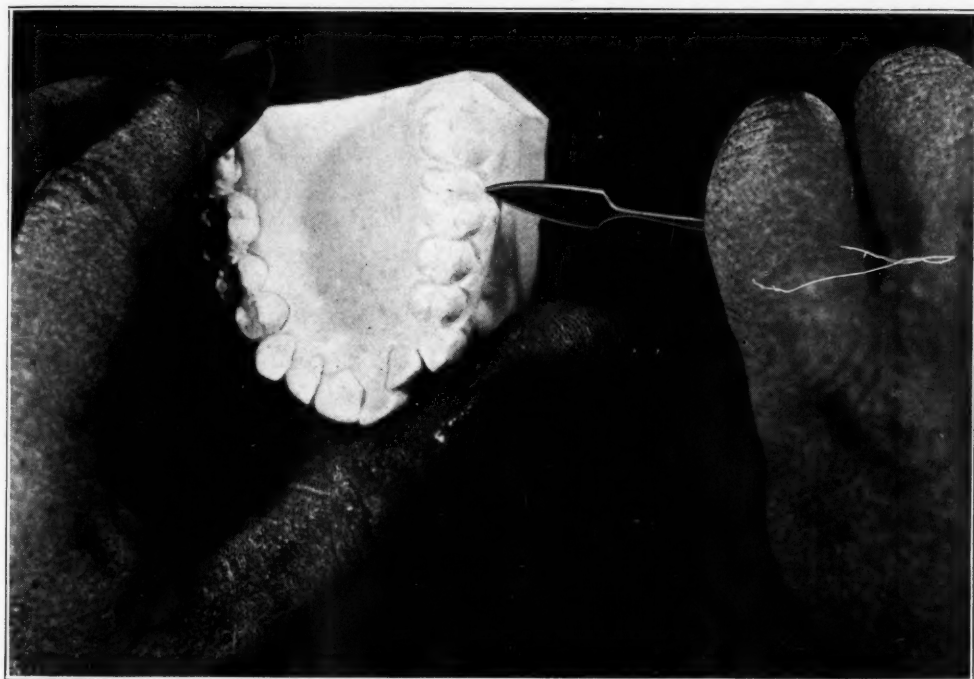


Fig. 8.



Fig. 9.

to fit over them accurately. If the model plaster is moistened, the individual parts have sufficient adherence to remain in position, allowing the advanced steps to be taken with accurate calculation of size.

CARVING MODELS.

After the design of appliance has been determined, the next step is the carving of the cervical borders of the posterior teeth selected to bear the "partial clasps" lingually and the "spring clasps" buccally. Dr. Jackson has always emphasized this point, for the security of anchorage depends on the use of the cervical constrictions.

Along the linguo-cervical borders of all posterior teeth which are to bear "partial clasps" a very thin, sharp-pointed instrument should be drawn to make a narrow groove to represent the natural space between the cervix and the gingival border of the free margin of the gum. This instrument should be inserted at an angle of approximately 35 degrees from the axis of the tooth to carve out the groove anatomically correctly (Fig. 7).

The bucco-cervical borders of teeth to bear spring clasps must be brought out clearly by trimming away the slightest possible amount of the outlines of the free margins of the gums. To do this, the instrument should approach the surface at right angles from the axis of the tooth (Fig. 8). The surplus left between this line and the buccal surface can be carved away, thus opening a distinct outline of the bucco-cervical border to which to fit the clasp (Fig. 9).

PARTIAL CLASPS.

The next step is the construction of "partial clasps." "Partial clasps" are made of partial clasp gold, a material specially prepared by Dr. Jackson for this purpose. It is a stiff 36-gauge plate metal, possessing a specially treated surface on one side for a very tenacious adhesion with the tin solder, and a pure gold surface for contact against the teeth. This material will respond to the contouring plier without annealing, but it is made specially hard to prevent the borders from curling out of the cervical constrictions under the operation of insertion and withdrawal.

The success of attachment depends greatly on the adaptation of the partial clasps into the linguo-cervical constrictions of the anchor teeth, held in position by the spring clasps buccally. As these borders glide over the convex lingual surfaces during removal and insertion, they would be bent outward if made of soft material, causing the apparatus to loosen. This strain will also cause a weak solder connection to loosen, so that the partial clasps will scale off, leaving only a solder surface in loose contact with the tooth. For these two principal reasons this material has no substitute, and, being the first step in the construction, failure here results in complete failure of the appliance.

Partial clasps are to be fitted to all the posterior teeth engaged in the arms of the appliances for anchorage. They must be fitted with perfect accuracy well into the cervical constrictions, slightly beneath the free marginal outlines of the gums. The ends of the partial clasps should extend to the mesial and distal aspects of the lingual surfaces, but not into the proximal surfaces. If these ends project too far interproximally, they prevent the appliance from seating, wedge the teeth, and cause painful injury to the interproximal tissue.

Partial clasps should extend toward the lingual cusps, slightly occlusally to the point of greatest curve of the lingual surfaces, but not far enough to interfere with the occlusion (Fig. 10).

The treated surface of the metal must be faced outward, with the pure gold surface touching the model, and this specially treated surface can be readily distinguished by its color and finish. A wider strip should always be cut for the molars than for the premolars in order to keep the occlusal borders on a straight line mesio-distally.

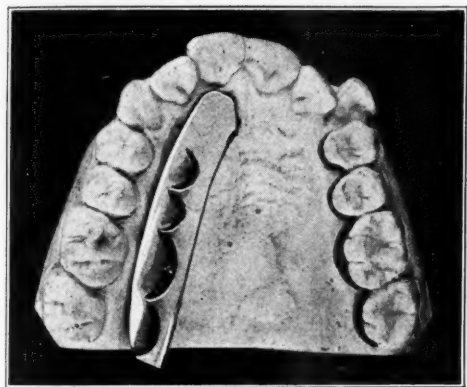


Fig. 10.

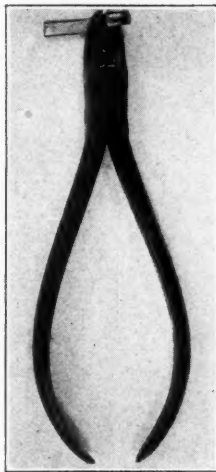


Fig. 11.

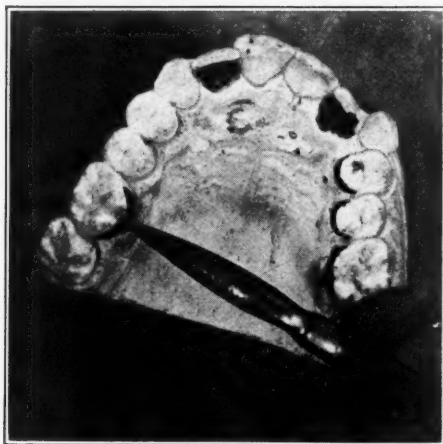


Fig. 12.

The contouring plier (Fig. 11) will conform the strips to the double curve of the lingual surface to any desired length. After trimming the cervical border to fit perfectly, the partial clasp should be carried to place, with the curve of the plate smaller than the curve of the lingual surface of the tooth, and it can then be enlarged by pressing it to position, where it will remain securely (Fig. 12).

SPRING CLASPS.

Spring clasps are divided into two forms—full and partial. The full spring clasp entirely encircles the tooth, crossing from the lingual to the bucco-cervical

constrictions over the interproximo-occlusal grooves, with both ends attached in the solder. This design is typical of the removable appliance.

The partial spring clasp only partially encircles the tooth, crossing over only the mesial or the distal interproximo-occlusal groove, traversing the bucco-cervical constriction, terminating at the opposite proximal side whence it crossed for attachment lingually. This clasp is used both in the fixed-removable and the removable types. Two spring clasps are employed on both sides of the arch

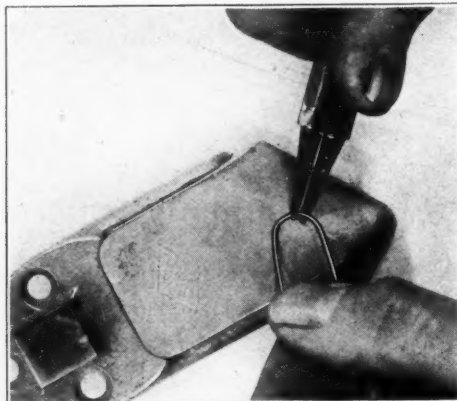


Fig. 13.



Fig. 14.

to secure balance of attachment, and are usually placed on the most anterior and most distal teeth engaged in the arms of the appliance.

Spring clasps are made of 21-gauge and 20-gauge special alloy nickel silver wire. Number 21 gauge is generally indicated in all partial spring clasps and also in the full spring clasps, excepting for specially large teeth. The wire should be cut into between two- and three-inch lengths, and the bending begun in the middle to permit of free holding for bending until the clasp is complete. The clasp wire should first be bent to the curve of the gum scallop on the buccal surface, with the two ends pointing occlusally to the proximal sides.

After this the second step is to bend this bucco-cervical portion into a second curve, the curve of the bucco-cervical constriction, mesio-distally. For this it is necessary to use the brace of a rubber block to control the bending accurately (Fig. 13).

The third bend requires the greatest accuracy because it forms the angle between the buccal and occlusal surfaces. If this bend is too high, it causes the occlusal portion to interfere in occlusion; if it is bent too low, the bucco-cervical region will be too short on the teeth to reach the cervical constriction. To grasp the wire accurately, the operator should possess a medium-length left thumb nail, so it can make the grasp accurately (Fig. 14), bringing off the wire so the end of the round-nosed plier can pick up the exact point by running it down over

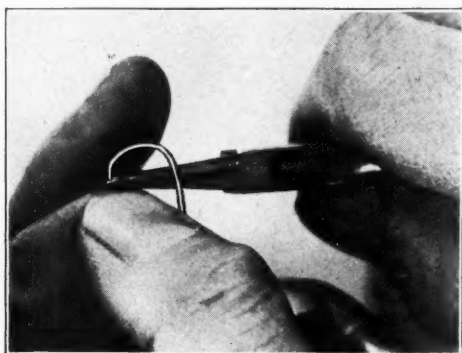


Fig. 15.

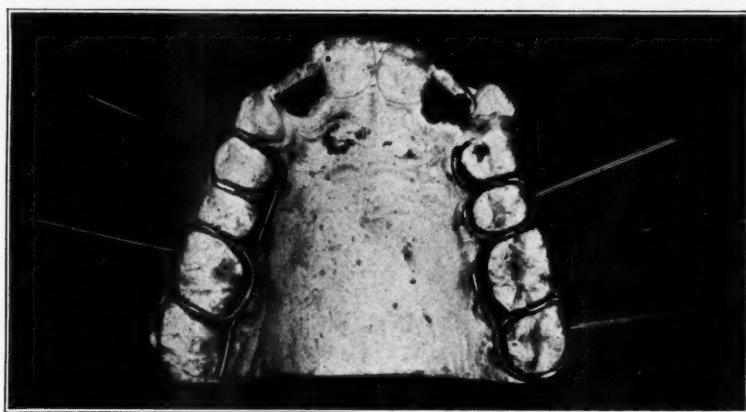


Fig. 16.

the surface of the thumb nail (Fig. 15). It is far better to continually under-bend, trying to position frequently, and in this way continue progressively. By bending too far, the work has to be undone, started over again, and usually the part is ruined by inaccuracy and breakage by crystallizing the wire.

In making full spring clasps, the mesial and distal portions should be carried across the occlusal surfaces together, for, if one side is finished first, the clasp is liable to be warped. After fitting across the occlusal surfaces, the ends are bent downward, to be curved around midway of the partial clasps for soldering. The mesial end should be bent to traverse the entire length of the partial

clasp distally and *vice versa*, so as to gain a strong mechanical attachment in the solder. If these ends are cut short, they may pull out of the tin, which is caused by a mild galvanic corrosion which gradually makes ingress between the wire and the tin, loosening the adhesion a short length around the wire at the point of entrance into the tin, causing a short straight end to pull out.

It is also important to extend the ends of the spring clasp wires to rest against all partial clasps not engaged (Fig. 16). If this is not done, the attraction of the molten tin as it is drawn over the partial clasps on the soldering iron is liable to pull them off or displace them slightly.

After finishing the partial clasps and the spring clasps, the anchorage or "arms" are completed. It is best to unite the number of small parts at this juncture, reducing to one unit on each side the five to ten small parts which are very important to preserve accurately, and which are liable to displacement during the advanced steps.

The weight of the soldering iron against the lingual ends of the clasps is liable to elevate the bucco-cervical portions, where the greatest accuracy is re-

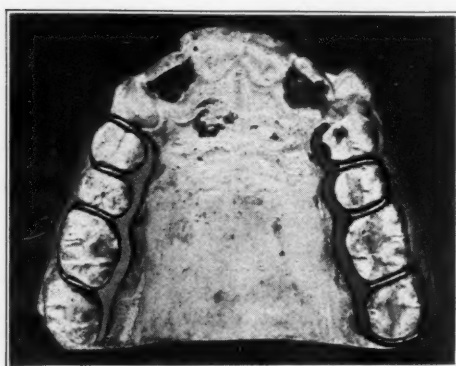


Fig. 17.

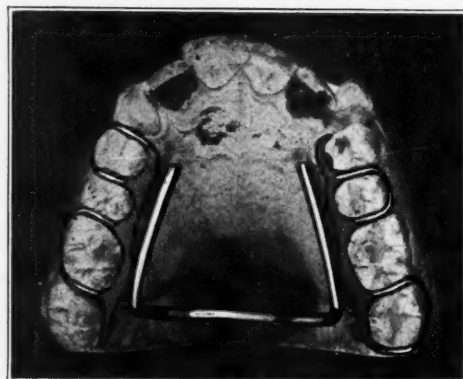


Fig. 18.

quired. To prevent this, pins should be inserted to hold the clasps very securely in place (Fig. 16). The thinnest film of solder possible to make the attachment should be used to keep down the bulk of the appliance (Fig. 17).

The next step is the construction of the "base wires," or "body wires," for the connection of the anchor "arms" across the palate in the upper end and in the sublingual region in the lower.

BODY WIRES OR BASE WIRES.

The body wires are made of 12-gauge for average cases, although the gauge should range from 9-gauge to 14-gauge, varying with age, extent of development required, control of bulk, etc. The body wire can be made into a number of different designs, but the best plan to follow is to use the simplest form suited for the needs required.

The simplest form of upper body wire is made for premolar and anterior expansion only (Fig. 18). This form is made by bending a piece of wire about 6 inches long into a U-shape to fit around the dome of the palate at the desired point across the molar region.

Care must be taken, in determining the points, to bend the ends forward from the points of contact against the molars. If these angles are too high, they will interfere with the occlusion and impart bulk and bad finish. The measurement should be taken with the thumb-nail grasp, and should be made low enough so that the *outer curve* of the wire will only touch, or, failing to touch, will approximate closely the linguo-cervical borders of the molars.

In all heavy wire bending, special care must be taken to calculate the position of the outer curves, and to do this the wire must be grasped in the pliers at a point the diameter of the wire away from the desired point of the bend,

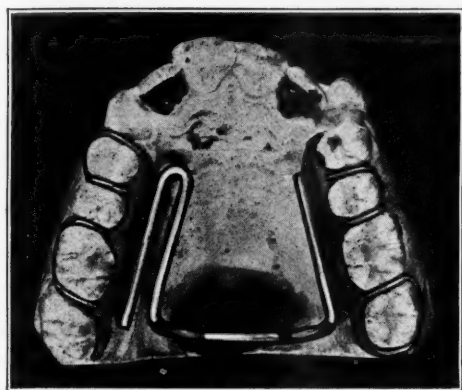


Fig. 19.

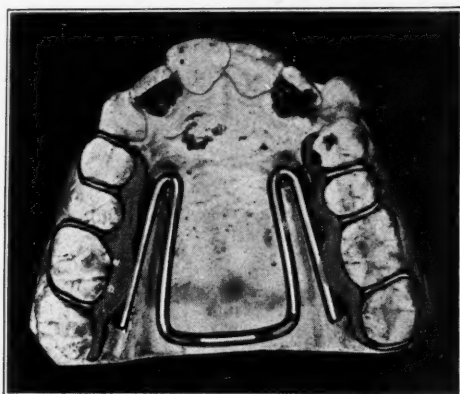


Fig. 20.

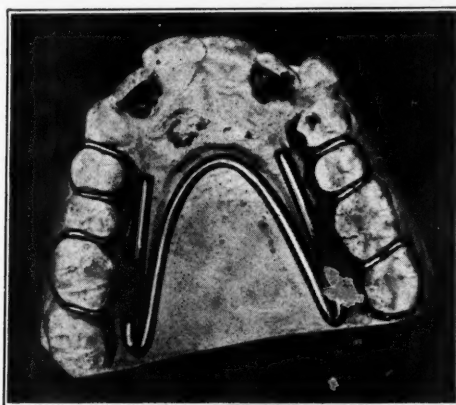


Fig. 21.

so as to make this allowance in the height of the curve. The palatal part of the wire should enter the sides about midway of the lingual surface of the distal teeth engaged in the appliance, and the ends should always extend forward or backward, as the case may be in the different designs, to about midway of the lingual surface of the tooth at the opposite end of the anchor arms. This will impart a round finish at the ends, which is lost if the ends project beyond these points.

It is absolutely necessary for the side parts of the body wires to extend the full length of the anchor arms to render them rigid. Because the linguo-cervical borders of the molars are higher than the premolars, it will be found that, as the

sides of the body wires extend forward, a space will be formed between the wire and the partial clasps on the premolars. It is in this space, that the ends of the anterior extensions must be fitted and soldered, and the size of the space may be determined by the number of springs to be used (Fig. 18).

Fig. 19 illustrates a body wire for premolar expansion and molar expansion on one side only. Fig. 20 illustrates a body wire for bicuspid and molar expansion on both sides. These are made by bending the wire into the U-shape on the curve of the palate at the posterior region, and then the forward bends are made, to be looped back parallel around the jaw of a round-nosed plier, so that the end will terminate at the molars. Care must be taken to preserve the space in the bicuspid regions for the anterior springs, and this list loop must not be higher than the cervical zone, so that the finished appliance will not interfere occlusally.

The form of body wire found to be most effective for premolar and molar expansion on both sides is shown in Fig. 21. This design contains less material

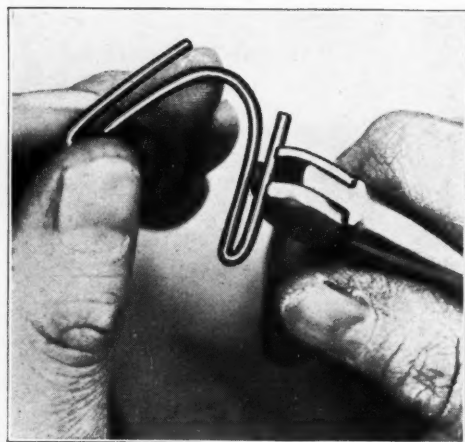


Fig. 22.



Fig. 23.

than the one in Fig. 20, and responds to the lines of lateral development with better effect. In constructing this style of body wires, the wire is first bent into a U-shape, to rest in the dome antero-posteriorly, with the ends pointing distally. The ends are then looped over the jaw of the round-nosed plier and brought forward, observing the same precautions as to position and terminating midway of the lingual surfaces of the teeth at the anterior ends of the anchor arms. Body wires *must not* touch the soft tissues at any point. After construction, they may be held to position with moldine, and should be tacked to place with a very little solder on both sides (Fig. 21). The finer bending of these heavy wires (Fig. 22) can be made to the best advantage with a plier designed by Dr. Case (Fig. 23). Soldering the body wire to position completes the body and arm portions.

FINGER SPRINGS.

All extensions of springs from these parts are known as "finger springs" or "fingers." "Fingers" are made of Nos. 18-, 19-, and 20-gauge wire, and are

adjusted usually to the surfaces of teeth opposite the direction of movement. "Fingers" vary in design with every individual case.

Careful comparison of a given irregularity with the normal, and measurements to determine the extent and direction of tooth movement, may show the path of movement toward the normal to be such that the arch may be corrected in segments and the study of other conditions may show that all teeth must

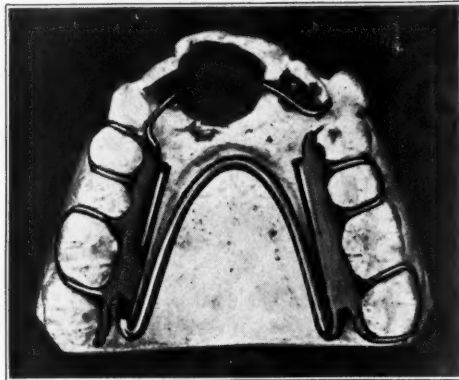


Fig. 24.

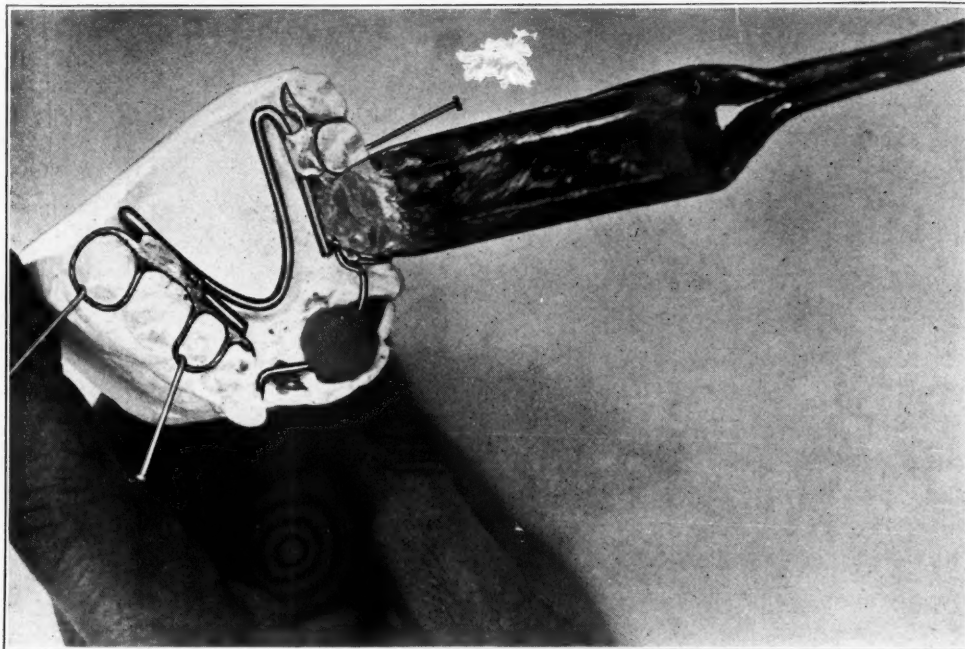


Fig. 25.

move on individual paths. The effectiveness of the Jackson method is its great adaptability of design to meet varying needs with equal advantage and facility.

Fig. 24 illustrates a condition caused by the premature extraction of the left deciduous cuspid, which, by breaking the proximal continuity of the arch, allowed the muscles to narrow the two posterior segments and drift the incisors lingually from the right cuspid at the center of the rotary axis. The molar ex-

panding body wire is indicated for restoring the two posterior segments to normal width.

One lingual "finger" bent on the normal curve of the lingual surfaces should be attached to the right arm of the appliance. By rendering this finger active with the right cuspid at the rotary center, the path of movement of each incisor will be determined by the radius of the spring from the central axis to the point of contact at each tooth. The path of movement of the left lateral will be outward and to the right on a greater arc than that of the left central. The path of movement of the left central will be on a greater arc than that of the right central. The path of the movement of the right central will be on a greater arc than that of the right lateral. By the pressure of this spring, each incisor will be moved along different paths toward their normal positions, restoring normal incisal relations and concentrating the space gained for the left cuspid.

SOLDERING.

The appliance is shown in Fig. 25 prepared for the finishing soldering on the right side. The "finger" is held to position with moldine, and the spring

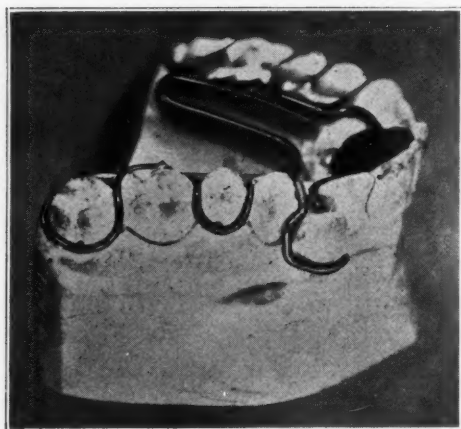


Fig. 26.

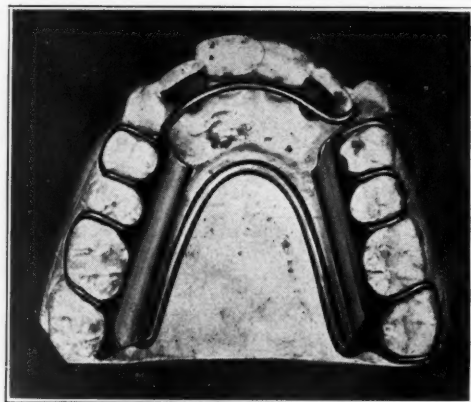


Fig. 27.

clasps are repinned to place to prevent them from slipping buccally. Zinc chloride is now applied to the entire side freely. The hot iron is dipped continually into the flux before soldering to keep it well tinned and clean. Globules of pure block tin are carried by the iron and flowed well down into the crevasse between the clasps and the body wire. Enough solder should be applied to slightly round off the exposed surface, to impart a smooth finish.

Fig. 26 shows the buccal aspect of the left side finished. A buccal "finger" has been extended to press the cuspid into alignment after ample space is made for it. This illustration also shows how the spring clasps have been shifted to the second premolar and second molar on this side to prevent the need of two wires crossing the occlusion between the first premolar and the canine.

Fig. 27 illustrates the exposed aspect of the soldered appliance ready for removal from the model for the first time for polishing. It also shows the laterals collared with lugs, soldered to the lingual surfaces, beneath which the "finger" snaps to be held securely to position. Here we have an interesting il-

Illustration of the control of shifting anchorage for which the Jackson system is noted. All of the posterior teeth are anchored against the labial movement of the incisors. The incisors and right posterior teeth are anchored against the left posterior teeth (ten anchor teeth against four teeth to be moved), which have moved lingually more on the right side. The exposed surface of the appliance removed from the model is shown in Fig. 28.

TRIMMING AND POLISHING.

After a sufficient amount of tin is added to the sides of the arms, it should all be melted along the full length at one time. This will cause it to harden with

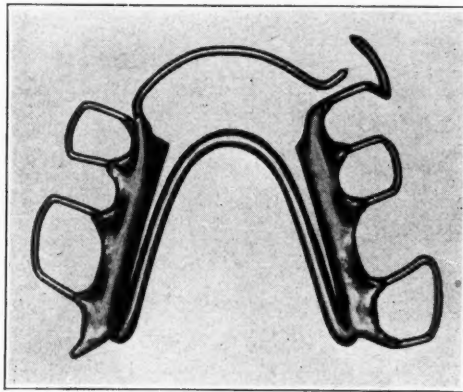


Fig. 28.

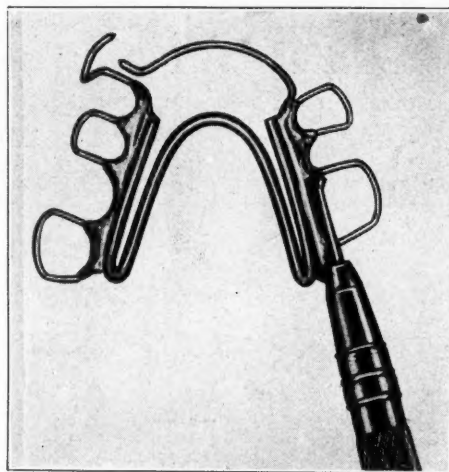


Fig. 29.

a uniformly smooth surface, which will require only a few strokes from a sand-paper disk to prepare for the lathe polishing. The lingual side of an appliance requires very careful attention in polishing. Sharp projections of the partial clasps extending too far interproximally should be cut away. When the solder runs around the ends of all of the wires, completely enveloping them, it is cast against a strip of plaster representing the outlines of the free margin of the gums. If this solder should touch the soft tissues, a slight compression will be

established as the appliance settles. This pressure will exclude the circulation from the capillary terminals and will devitalize strips of tissue, which will resolve into a dense white mass. To avoid this, the palatal side of the tin between the cervical borders of the partial clasps and the body wire should be cut out a reasonable depth, forming a smooth concave surface, with a self-cleansing space between the appliance and the gums (Fig. 29). Great care should be taken in this step to not injure the cervical borders of the partial clasps. They should be left projecting well up above the tin, to enter the cervical constriction at the gum borders. Fig. 30 illustrates this, showing a cross-section cut through the middle of the molar clasps.

After smoothing all sharp points to be found and rounding the ends of the "finger" springs, appliances are to be polished with the lathe. A felt wheel should



Fig. 30.

be used with a stiff mixture of pumice for the exposed surfaces of the tin, which will make the tin very smooth. The palatal portion of the tin can be polished with bristle brush wheels with ample pumice.

After removing all tool scratches with pumice, a luster can be imparted by washing off the pumice, drying the appliance, and reapplying the same brush wheel with which the pumice was used, when the moist bristles with the slight amount of remaining pumice will impart a lasting finish. The final luster can also be made with prepared chalk paste on a camel's-hair wheel.

Jackson appliances retain a triple plate of gold very beautifully. Plated appliances cannot be cleansed so well as the plain surfaces and are more conspicuous.

The next number will continue construction designs and manipulation of Jackson appliances.

A UNIQUE METHOD OF MOUNTING PHOTOGRAPHS

BY CARL O. ENGSTROM, D.D.S., SACRAMENTO, CAL.

THE accompanying photograph presents a case of Class II, Division 1, showing three juxtaposed side views of the face, each illustrating a stage in the treatment. The first view was taken in January, 1915, at which time treatment was begun. The second was made June, 1915, or two months before the placement of the retaining appliances, and the third was made January, 1916. In comparison with separate photographs, this combination of views shows to better advantage the changes that occurred as the result of orthodontic treatment. In looking from one object to another, distraction of the mind is natural, and the amount of distraction is in direct proportion to the distance of separation.

Hence, the closer together the objects are, the less the distraction of the mind, and the more definite, comprehensive and correct the observation.

Three separate negatives were used in printing this photograph, and each was a full side view. A screen of yellow paper was prepared approximating the profile of the second view. This was used in the printing of the first negative to screen the sensitive paper, thus keeping it clear for the reception of the second view. When the second view was printed, the first profile print was covered, and the second negative screened to protect the paper from the reception of the third print. By this means many views may be printed on one paper. If the plate is



so placed in the printing frame that it sets a little back of the ~~one~~ printed in front, a more distinct profile is produced, owing to the clear field previously maintained by the screen. However, the hair may be screened so as not to allow this space, thereby causing a blending of the views in this region.

In the study of these pictures, note that five months intervened between the first and second views, and seven months between the second and third views. Also, note particularly the development of the lower jaw. Aside from the changes in the face, most striking changes are evident in the physical structure and the mental attitude of this patient.

INFECTIONS OF THE ANTRUM *

BY E. M. SEYDELL, M.D., WICHITA, KANSAS.

THE subject of my paper is one familiar to all of you. It is a condition caused both by infections resulting from pathological conditions in the mouth, and by direct infections of the mucous membrane lining its cavity from the nose, and therefore is of interest to both the dental surgeon and the rhinologist. From an anatomical and physiological sense the sinuses belong to the nasal cavities, being lined with the same kind of epithelium and supplied by branches of the same blood vessels, and communicating with one another through openings in their bony walls. Rarely the antrum also communicates with the ethmoidal and sphenoidal cells. Until late years it was supposed that the majority of the infections of the antrum were of oral origin. Lately there is a tendency to believe that they are mostly of nasal etiology. It is of course natural to suppose that the majority of those cases seen by the dentist are of oral origin, yet, in my experience fully 25 per cent of the cases sent to me by dental surgeons have been of nasal origin. Etiologically speaking we have the genuine mucous membrane inflammations resulting from an infection of the nose. Acute coryza (acute rhinitis) may extend by continuity of surfaces, or by indirect infection, to the sinuses. Therefore the causes of the former, which are infinite in number, may also be accounted exciting factors in the causation of maxillary disease. Among the other prominent causes may be cited those infections caused by the micrococcus catarrhalis, influenza bacillus, the bacillus segmentosus, the pneumococcus and the exanthematous diseases. Diphtheria and erysipelas must also be mentioned. In any mucous membrane infection the liability to infection of the antrum is greatly enhanced by improper drainage due to septal deviations, enlarged turbinates, polypi, etc.

Again in many of the chronic systemic diseases as in diabetes, rheumatism and tuberculosis, we find a predisposition toward sinus disease. I will also mention nasal operations, nasal tampons and other injudicious dressings, foreign bodies, vomited matter, etc. The antrum may become infected by extension from the oral cavity. This is prone to occur where the roots of the teeth are only separated from the floor of the antrum by a very small plate of bone, as in those cases of sinus alveolaris, or in the rather rare instances where the roots of the teeth actually project into the antrum. In either of these cases it is easy to see that any of the various inflammations around the roots of the teeth may easily produce an antrum infection. Infection may also be carried into the antrum by the dentist "accidentally" perforating the alveolar process; trauma of other nature may cause infections. The pathological conditions of the superior maxillary bone, with which you are all familiar, might be divided into: (1) The acute root abscesses, brought on by caries of the teeth. (2) Acute periostitis which follow the extraction of a tooth where the antrum has been opened by the operation. It is not often that the puncture causes the trouble, but the subsequent infection of the alveolar process extends into the

*Read before the Wichita Dental Society, February 8, 1916.

antrum and thereby produces an infection. This is even more apt to occur where the opening has been made in extracting a tooth where a previous periosteal abscess existed. The second premolar and the three molar teeth are usually beneath the antrum and therefore are the causative factors in most of the cases, but the canine and even the second incisor have been known to produce the infection of the antrum. (3) Thirdly we have those cases of circumscript and diffuse osteitis of the alveolar process. This may have its origin in caries of the tooth or be caused by trauma or osteomyelitis, and by causing a necrosis of more or less of the alveolar process, affect the antrum. We will now consider those chronic inflammatory changes of the roots of the teeth and the alveolus, which may affect the antrum. First we may cite those cases of periodontitis in which the granuloma, or epithelial lined purulent cyst, at the apex of the root, causes a resorption of the overlying bone, encroaching upon the mucous membrane of the antrum and finally infecting it. *Durchwanderen* "wandering through" of an infection through the alveolar process from an inflamed root, is undoubtedly the cause of many other infections. It has been shown by Hinsberg and Hyjek that it is possible to have an extension of an infection through the walls of the frontal and sphenoidal sinuses to the neighboring parts without any macroscopic changes in the bone. We have all seen cases where it was possible to demonstrate an opening through the root canal, upward into the antrum, which could not be found after extracting the tooth, due to the minute opening in the alveolus. Microscopically, it would no doubt be possible to find the infected tract through the seemingly normal bone. I also find mentioned as etiological factors, improperly placed crown pins and root canal filling, of gutta percha, etc. Late literature has shown that an almost unbelievable number of cases in which the teeth are filled, and are not giving any apparent trouble can be shown by x-ray examination to have apical abscesses. The reason that we do not have more antrum infections from these sources is no doubt due to the protection afforded by the lining membrane of the sinus. Among the pathological changes of the mucous membrane of the antrum we must consider the acute catarrhal inflammations. Here we find the membrane edematous, thickened, and infiltrated with a yellowish fluid. The changes may either recede, and the mucous membrane take on a normal appearance, or a chronic condition may result. Microscopically we find a round cell infiltration of the upper layers of the mucous membrane, the epithelium remaining unchanged. The connective tissue spaces being enlarged and containing fluid. In the chronic forms we find that the deeper layers of the mucous membrane are also involved.

The tissue becomes spongy and very much swollen, sometimes attaining ten to fifteen times its normal thickness, which is termed the edematous form. In other cases, we have a hyperplastic condition which probably follows the former. Here we find a hard pale membrane which may almost obliterate the antral cavity, or may cease development at any stage. Microscopically, we find in the edematous form a round cell infiltration of the subepithelial layers and around the mouths of the glands. The connective tissue fibers are forced apart and filled with fluid. In the hyperplastic, we have a scar-like degeneration of the connective tissue fibers, with a closure of the gland ducts and cyst forma-

tion. Next in order are the acute empyemas, in which we find edema of the mucous membrane with hemorrhages here and there; the surface of the membrane being covered with pus. The tissues are usually not as swollen as in the acute catarrhal form. The microscopic changes are similar to the catarrhal, except that pus is present. There may be a complete restitution or the condition may become chronic. In rare cases we find a fatty degeneration of the pus with which the antrum is filled forming a material of cheese-like consistency. In the chronic empyemas, we find practically the same changes as in the chronic catarrhal excepting the purulent or mucopurulent discharge. Ulcerations of the mucous membrane may occur and cysts and polypi may be found. The pathological condition of the mucous membrane of the antrum may show edematous changes in one portion and hyperplastic in another. Oppikofer found metaplasia of the ciliated epithelium to stratified squamous in thirty-five cases out of one hundred examined. Finally we may have a diphtheritic inflammation of the mucous membrane with its usual changes.

Rarely the inflamed condition may cause bone changes in the walls of the antrum, which may result in perforation of the same causing abscesses, or phlegmons, in the areas into which they perforate. This complication may result fatally as can be easily seen, when one remembers the structures which surround the antrum.

The pathological conditions which favor perforations are infections along the veins which traverse the bone. Further it is no doubt true that many of the severe complications are not due to perforations, but to an extension of the periostitis accompanying the severe forms of dental infections. As a result of inflammatory conditions of the antrum we may find mucous membrane cysts, these are common and may be single or miliary. Polyps of the antrum are rarer. Osteophytes and rhinoliths may also be mentioned. Lastly, I will mention the condition known as hydrocephalus antri, which is an accumulation of free serous fluid of inflammatory origin due to a closure of the natural opening, causing a dilation of its walls.

Symptoms.—Pain is one of the most important subjective symptoms of antrum trouble. Local tenderness or pain is only found regularly in acute empyemas of dental origin where considerable periostitis is present, and in very severe influenzal, and erysipelatous infections. The character of the pain being one of tension, is usually most pronounced in the region of the frontal process of the maxilla. The pain may be constant, or "neuralgiform" in character. This may be accompanied with neuralgia of the supradental nerves, causing a dull ache in the upper teeth, or the patient may complain of a sensation of lengthening of certain teeth. With the above, or appearing as the only symptom, one may have a supraorbital pain. This may only appear at certain hours of the day. The pain in the chronic forms, unless there be an acute exacerbation, is not characteristic, nor localized.

Objectively the most important symptom is the appearance of a discharge from the nose, or a postnasal dropping; it may appear in large, or small quantities. In those cases, where a periosteal abscess breaks into the antrum, the patient suddenly expels a large quantity of stinking pus. In the chronic forms there may be a continual discharge, to which the patient may become accustomed, and it

may be impossible for him to remember when it was first noticed. The acute exacerbations are noted as acute colds, etc. These patients come to us to be cured of their catarrh. In some cases there is only a postnasal dropping, or a dry condition "pharyngitis sicca" of the nasopharynx, pharynx, or even the larynx. This is usually present in those cases where a nasal obstruction prevents the discharge from being expelled through the nostrils. Cacosmia, that subjective symptom where the patient is able to detect an odor arising in his nose, when it is not noticeable to others, is characteristic of antrum disease. Other subjective symptoms are nasal stenosis, loss of sense of smell, etc. Symptoms due to absorption of the pus from the antrum, or caused by swallowing the purulent material, will not be discussed. Objectively, we usually find pus in the middle fossa of the affected side, which after being removed usually returns, again only dry crusts are found. In some cases of nasal stenosis it is only possible to detect the pus by posterior rhinoscopy. Again by placing the head in a favorable position we may be able to demonstrate pus in the nasal cavity. The chronic inflammations are often accompanied with polypi. These are not characteristic unless found unilaterally, and in the middle fossa of the nose. Swelling of the cheek, and edema of the lower lid are usually only found where a periostitis of dental origin is the causative factor, the exception being the severe forms of influenza and erysipelas. We also sometimes see a fleeting edema, and redness of the skin over the antrum.

Diagnosis.—Due to the variety and inconsistency of the subjective and objective symptoms it is only possible to make a positive diagnosis of antrum infection in a few cases without rhinoscopic examination. This can really only be done in those acute cases of infectious origin where the condition starts with chills, fever, discharge, local tenderness and swelling and neuralgiform pains over the facial distribution of the infraorbital nerve; also, more rarely, in those cases of dental origin, where following a periostitis, or the extraction of a tooth, we suddenly find a discharge which had not existed before. It must be remembered that we may have bad teeth on the side affected, which may even communicate with the antrum, and the history show an acute involvement, but in examining the nose we may find polypi, or other evidence, which shows that a previous infection existed, not only in the antrum, but in other sinuses as well. The frequency of more than one sinus being infected at the same time necessitates a thorough examination of them all. Most often, especially in the chronic cases, the symptoms are not characteristic and the picture is not complete, in fact we may have only one symptom, the appearance of pus in the nose, or nasopharynx. To prove that this originates in the antrum is the object of our search; after cleansing the nose, note the appearance of fresh secretions in the middle fossa. If no pus is present, or none returns, place a tampon saturated with cocaine and adrenalin under the middle turbinate to shrink the swollen tissues, and then use the suction apparatus. If the appearance of fresh pus is established we must differentiate between an infection of the frontal sinus, ethmoidal cells, and the antrum, as these sinuses all empty into the middle fossa. My next step is transillumination. One cannot entirely rely upon the findings of this diagnostic aid, due to the differences in the normal thickness of the facial bones, both uni- and bilaterally. We may have bright transillumination with some pus or mucous present or darkness

where none exists. A periostitis or a previous inflammatory condition of the antrum may also darken one or both sinuses.

The x-ray may also be utilized, but again it is possible to err, especially in interpreting the plates. The cost of the procedure makes it impracticable in many cases. The teeth on the suspected side should receive an exceedingly careful examination by a dental surgeon. If diseased roots are present they should be probed under aseptic conditions with great care to establish any communication with the antrum. If necessary x-ray plates of the apices and alveolar process may be made.

We can now proceed to the positive method of diagnosis; washing out the sinus either through its natural or artificial opening. If I find it impossible to catheterize the normal opening I puncture the nasointral way well up under the lower turbinate, which may be accomplished with practically no pain. I am not in favor of making an exploratory opening through the alveolus or the canine fossa, due to the possibility of infecting a normal sinus or complicating an infection already present by a bacterial flora which is foreign to the nose and pathogenic to it. It was formerly practiced by dentists and rhinologists alike, but is very rapidly falling into disuse even among the dental surgeons.

After a presence of pus has been proven to exist in the antrum one must exclude those rare cases where the antrum merely acts as a reservoir for the secretions of other sinuses. Dentigerous cysts and malignant disease must be considered.

Prognosis.—Acute cases may end in recovery, chronic suppuration, or death. The prognosis is usually good, especially in the cases of nasal origin. Death very rarely occurs. It is impossible to give the patient a positive prognosis in the chronic suppurative conditions of the antrum. They almost never heal spontaneously. Personally, I have been exceptionally fortunate in the cases that I have operated upon in a radical manner, but have had a number of failures in the conservative methods of treatment.

Treatment.—There are at least twenty-five accepted methods of operative treatment for antrum infections, so it will quite naturally be impossible for me to discuss so lengthy a subject. I will, therefore, adhere to those methods I have found practicable or impracticable.

The treatment rests upon the accomplishment of two factors: the removal of the cause, and drainage of the secretions. The first of these factors can practically only be carried out in those cases of dental origin where it is possible to remove the causative roots, or open the periosteal abscess and perhaps remove a sequestrum of bone. In rare cases one may be called upon to remove a foreign body. The second factor may be divided into the conservative and the radical methods. Under the conservative we may try the washing of the antrum through its natural opening. This method can only be used in a few selected cases, due to the natural limitations, small ostia, thick secretions, deviations of the septum, etc. Next I will mention opening the antrum below the lower turbinate, with a subsequent enlargement of the opening if necessary. With this method I have had very good results, and never advise a radical operation until this has been given a thorough trial. The opening can be enlarged so that the patient experiences no difficulty in treating the condition himself, if this is necessary. I wash

out the secretions daily at first, and as the same diminish, lengthen the interval. Care should be taken that no wash water is left in the antrum after cleansing.

The opening through the aveolus (Cowper's operation) I only recommend in those cases where a periostitis, following an abscessed root, has broken into the antrum. The opening through the canine fossa is very unsatisfactory.

In radical operations, I have found that for ordinary conditions I get the most satisfactory results from a modification of the Canfield-Ballinger or pre-turbinal operation. This operation can be performed either under local or general anesthesia. There is no opening communicating with the oral cavity. No destruction of physiological tissues. Rapid healing. The Caldwell-Luc is preferable where the nasal cavity is small. Also where it is necessary to keep the antrum packed for a long time as in necrosis of bone in the floor or walls of the antrum. The Denker is only necessary where an extremely large opening in the antrum is required as in cases of new growths. I am a firm believer in giving the conservative methods a thorough trial. Failing in this I heartily recommend the intranasal operation of Canfield-Ballinger.

PREVENTIVE DENTISTRY

An Answer to the Present Dental Dilemmas*

BY DR. W. A. CHAMBERLAIN, ST. LOUIS, MO.

IS THERE any more fitting answer to the present day dental dilemmas than Preventive Dentistry? Consider the conflicting theories of the different branches of dentistry, which according to the present day authorities create difficult problems, which any dentist who is prompted by a desire to render honest service of the highest type, would be glad to avoid.

ROOT CANALS.

Was there anyone who heard Dr. Best who did not feel impelled to avoid all the root canal work possible, and to make an unusual effort to save the pulp rather than devitalize? Who would not now inflict a little more pain on the patient, and possibly wear on himself with the stress of the painful operation, rather than undertake the difficult, and in some cases impossible, root canal work?

Root canal work, the latest sensation in dentistry, and possibly indirectly so in medicine, by way of focal injection, has, to my mind, created many dilemmas. There was a time not long ago when I felt that all the methods of dental practice had been standardized, but now periapical conditions resulting in alarming general systemic conditions, have complicated most all branches of dentistry.

Reading an article by Dr. Raper along these same lines, he quotes Dr. Carr who says, "That if you do not do proper root canal work, the patient has heart disease, and if you do, the patient has heart disease when he gets the bill."

The root canal experts claim that there are a certain per cent of teeth which, on account of their abnormal anatomy cannot be properly filled, and that these

*Read before the St. Louis Dental Society, April 4, 1916.

teeth should be extracted regardless of other dental laws. These teeth may be any from the incisors to the third molar and because of the very serious and vital consequences that are possible, resulting from the unfilled portion, which serves as a focus of infection, it is advocated to extract at once.

Of those remaining, which by use of x-ray are found to be of such development as to permit of proper treatment and filling, there are several dilemmas created in the matter of devitalization in the vital teeth, and in the treatment of those in a putrescent condition.

DEVITALIZATION.

Arsenic, the most generally used devitalizing agent, and I should say satisfactory to the patient as well as to dentist, because of the ease of making the application, is no longer indicated. We are now informed that arsenic is so powerful and penetrative, that it attacks the periapical tissue, lowering its vitality so that it is susceptible to infection through the blood stream, even though perfect canal work has been done under aseptic conditions.

If arsenic is not used, we are confronted by the difficult conditions in accomplishing pressure anesthesia. Many cavities are located where the access is so difficult as to preclude this method. A more accessible cavity could be drilled, but that seems like unnecessarily mutilating the teeth. Then there are conditions of the pulp where to use pressure anesthesia would mean to force the bacteria of the cavity, or bacteria and bacterial toxins which may exist in a still partially vital pulp into the periapical tissue. This is not desirable, of course, and may be followed by complications.

Conductive anesthesia eliminates most of us, because of the skill and technic required. Furthermore, it is the opinion that very few patients would submit to it. Infiltration may be used with more or less success, and more or less pain.

General anesthetics may be used, such as nitrous oxide, and are very successful in single rooted teeth, but in posteriors experience has taught that it is not well to try them.

Of the two methods to choose between, pressure and general anesthesia, neither is successful in all cases, and both may be possible in some.

TREATMENT.

In the treatment of putrescent root canals periapical conditions result from the use of too strong drugs.

Dr. Buckley, in working out the chemistry of pulp decomposition, and the treatment for putrescent canals, gave us trikresol and formaldehyde as a specific. He showed how the treatment could be sealed in such a tooth without fear of gas pressure. How secure we have felt in the use of it, and now we learn that the formaldehyde is destructive to the apical pericemental tissue, as well as the germ which we pictured as lurking in the dentinal tubules.

In vital teeth if the canals are too fine for proper removal of the pulp tissue and proper filling, the canals must be enlarged first by smooth broaches and next by canal files aided by the decalcifying effect of a 20 per cent H_2SO_4 solution or paste. Just about the time the apical foramen has been successfully reached with a good sized broach, it is suddenly realized that the presence of a strong H_2SO_4 solution is hazardous.

FILLING.

After the difficulties of devitalizing and of treating putrescent canals, then comes the difficulty of filling them. It is claimed that in everyday methods employed in the average dental operating rooms, there is great possibility of infecting directly the apical tissue, and that consequently every such operation should be according to strict surgical procedure. Everything coming into contact directly and indirectly with the patient's tooth should be sterile.

CROWN AND BRIDGE.

In Dr. Goslee's text book on Crown and Bridgework, he gives as the consensus of opinion that all crowned teeth should be devitalized. Now there is fear to destroy the pulp in such teeth because of the consequent local and systemic deleterious consequences. Not because Drs. Rhein, Best, Ottolengui and others have shown us how it can be done successfully from the theoretical standpoint, but because in everyday work there is a margin of insecurity between the theory and practice. Consider the dilemma after deciding to devitalize a badly broken down upper bicuspid for the purpose of adapting a porcelain crown, to have the x-ray disclose one of the impossible roots. Would it be decided to extract and go on to the next one, or to forget esthetics and apply a gold crown or a gold inlay?

If the pulp is left in the tooth which is properly prepared by grinding for the crown, the dentist is confronted by the theoretical surgical impossibility of the irritation of cement in contact with mesoblastic tissue. If the enamel is left under the crown, the gum tissue suffers from the irritation of an improperly fitting band, creating thereby a disposition to gingivitis, and eventually pyorrhea, with the added danger of hematogenous infection of adjoining teeth where the periapical tissue is in a state of reduced vitality.

During this winter I have heard stated before this society, that insanitary bridges were giving way to removable dentures, and the day would come when partial plates would predominate on account of their sanitary features.

BACTERIA.

I want to quote from an article by Hewitt in the March issue of the *Dental Cosmos*. "Adami, in speaking of the defenses of the body against infection, discusses the mucous membrane with its underlying structures, as to its resistance to the entrance of infection and the conditions which allow infections to enter. Bacteria are constantly entering the organism, but in health they tend to be destroyed very soon after their reception. Certain leucocytes or wandering cells passing out on to the surface of the mucous membrane, act as a scavenger, and this either by actually taking up the microbes and digesting them or by carrying them back into the tissue where they can be destroyed. It is not necessarily the destruction of the surface layers which allows infection, the lowering of the vitality of the tissue is of the utmost equal importance."

He goes on to describe cryptogenic infections as lesions occurring in deep seated parts with no apparent break in the integument. "Cryptogenic infection can occur through the unaltered surface of the mucous membrane by the agency of the wandering cells of the organism, if the following conditions exist.

1. The presence of an excessive number of virulent organisms at one surface point.
2. Congestion of a mucous surface with the passage of an increased number of leucocytes.
3. Re-entrance at one region of an undue number of the same, bearing with them microbes.
4. Accumulation at one spot of recurrent deposits of such numbers of microbes that the bactericidal power of these cells become exhausted, and lastly,
5. Temporary or habitual lowered vitality and resistance to the introduction of the microbes."

All these conditions are fulfilled when we have a partial plate resting on the mucous membrane in conjunction with a pulpless tooth, which may have been filled with the utmost care; viz.: many organisms resting on the surface of the plate in close contact with the gum congestion, with the passage of the leucocytes bearing microbes to a weak spot in the apical regions. As suggested our supposedly sanitary partial plates will cause congestion of the gum tissue and consequently increase in the number of germs constantly being carried through the mucosa.

He goes on to say, "All the submucous tissues are subjected to a shower of pathogenic organisms entering both by wounds and through the tissue surface. The more congested this mucous membrane, the greater the number of germs which will enter."

This explains hematogenous infection nicely and applies to any colony of bacteria in contact with mucous tissue, whether it is on a plate, the saddle of a bridge, in food deposits around the necks of teeth, under overhanging fillings or crowns which encroach upon the gums, or in large deposits of salivary calculus. When any of the above conditions exist there is irritation with inflammation and reduced vitality. This means in the presence of large colonies of bacteria, the bactericidal power of the tissue cells is sooner or later exhausted, and the germs gain entrance to the tissue and blood.

A full complement of teeth, the orthodontist tells us, is necessary to normal occlusion and the normal locking of the cusps of a full complement of teeth is the vital retentive force following orthodontic treatment. Supposing it were necessary to devitalize a tooth through some lack of care during orthodontic treatment, and the x-ray showed the roots mal-formed and turning off at a sharp angle near the apex, would you extract and create another dilemma?

The physician, the guardian of the health of the individual, may trace or think he traces some systemic disorder to a focus of infection about a tooth and says extract. In such cases the mandate of the physician overrules the dentist. Perhaps the dentist knows that the patient will be benefited 50 per cent from the standpoint of infection, but damaged 70 per cent in the loss of chewing efficiency, indigestion and lowered vitality creating a possible dilemma of a vicious cycle of disasters.

PREVENTIVE DENTISTRY.

To all this confusion of conditions, is there any more satisfactory, more effective, and more beneficial answer, than Preventive Dentistry? Preventive Dentistry means, keeping all surfaces of the teeth clean, employing all known

means both by the individual and by the dentist, and should be based on Black's statement, "That teeth decay when they are habitually unclean and in structural defects." Consequently there should be instructions to the patient for his individual home treatment and office treatment by the dentist.

HOME TREATMENT.

The instructions to the patient are first: to equip himself with a proper tooth brush, one with the bristles arranged in tufts, and the length of the bristles graduating from the short bristles at the end to long ones near the handle. Inasmuch as it is the end of the bristle which does the cleaning, none of them should be so long that they bend over while sliding the brush over the teeth. This brush reaches the buccal surfaces of posterior teeth, especially because the further distally between the cheek and teeth, the narrower the space. The same holds good on the lingual of the lower molar. Start the brush on the gums, and with a rolling motion sweep down over the teeth. This cleanses the maximum tooth surface by allowing bristles to go between the teeth. It also massages the gums, and keeps them from receding, a tendency brought on by age.

Instruct the patient to use ordinary dental floss for polishing between the teeth in younger people and flat floss in older people, together with soft wooden toothpicks in those whose gums have greatly receded. Use a saponaceous tooth paste and finish with vigorous rinsing of lime water.

In time, with proper instruction, the patient will become most proficient with his mouth toilet. A good idea is to give the patient instruction to start at the hardest place first with the tooth brush, and finish at the easiest. Usually it is the other way, the patient beginning with the easiest place, which is the labial surface of the anterior teeth, a place which is kept fairly well cleansed by lip movement, and the excursion of food in the process of biting.

I have never heard a theory advanced for the popularity of a soap in dentifrices, except that of the action of the soap as a cleanser, and that it is right in line with the alkaline treatment. The theory of the detergent action of soap is partly that of an emulsifier, and largely that of an alkalic regulator, that is by what is known as hydrolitic disassociation. This means the soap is broken down by water into other substances of an alkaline character.

Pickerill's theory of acid mouth washes is a beautiful one, and was loudly heralded by the dental profession, who took to it quickly and extensively. Time has piled up more testimony against it than for it, so that judging from the expression of opinion among the profession the alkaline prophylactic treatment seems to be the most popular.

In the prophylaxis symposium published in the *Items of Interest*, May, 1915, Dr. Fones and others advocate the use of lime water as a mouth wash. The present day idea in Preventive Dentistry is to get rid of the gelatinous plaques in which the lactic acid bacteria flourish, producing their tooth decalcifying products. We are endeavoring to find some solvent for the gummy plaques which form in sheltered places about the teeth, inasmuch as it is almost a mechanical impossibility for the average individual to reach all surfaces of his teeth in his daily care.

Pickerill, and others claim that alkalies are the best solvents for mucin,

and it is upon this fact that Pickerill's theory of maintaining an alkaline saliva by means of an acid mouth wash is based.

Pepsin dentifrices have been introduced, and again the theory is beautiful, but as far as I can observe and learn, it does the work in practice.

The solvent effect of these agents mentioned, is more or less slight, and until some agent can be found which when taken into the mouth has quick acting effects, mechanical means will have to be depended upon largely.

Dr. Talbot stated in a paper, or a discussion before the Section of Stomatology of the American Medical Association, that if his solution of Iodo-glycerol was used to swab the buccal cavities three times a week, it would stop decay, and overcome the sensitiveness of denuded roots. Iodine has great penetrating properties as well as germicidal properties, and will penetrate the mucous plaques as well as deposits of fermenting food. In extreme cases of dental caries, I have prescribed this treatment and believe it is very effective.

The patient should appear at the dental office frequently, that is as often as is necessary, depending upon the success of his own efforts, and the tendency for plaque formation.

These plaques should be removed at short intervals, because the lactic acid germ begins the elaboration of its products at once. The rapidity of the decalcifying effects is governed by the resistance of the tooth, by which is meant the molecular arrangement of its structure; by the virility of the germs depending upon their favorable or unfavorable environment; by the carbo-hydrate medium, and by the neutralizing effect of alkalies in coming in contact with the colonies and their products.

It should depend upon each individual, and not be according to a general rule as every year or every six months; it should be every two weeks or every month as seems indicated. If each time the patient returns to the office, a disclosing solution is used, the places which he is not successful in reaching with brush or floss will be brought forcibly to his attention, and his efforts with his home treatment extended accordingly.

OFFICE TREATMENT.

The office treatment should consist of removing all calcareous deposits above and below the gingiva with delicate instruments preferably the Younger-Good pyorrhea instruments. Next polish with flower of pumice, or some diatomaceous earth, using dental engine with cup and disks. The hand porte polisher may be used with orange wood points instead of the dental engine, or may supplement the rubber cups and disks after which flat floss letter (R) should be used in polishing the proximal surfaces. Not only pass floss between the teeth but polish the proximal surface carefully with plenty of abrasive flooding the field of operation. Finish with spray using compressed air.

The sulci and pits of permanent teeth especially in the newly erupted, should be cleansed with engine polishing brushes and abrasive; then the tooth should be dried and the pits and fissures should be flooded with 20 per cent Ag No₃ and worked in with a sharp explorer. This should be dried and either white or black copper cement worked well into all the crevices, leaving as much on the occlusal surface of the teeth as is possible without interfering with occlusion. This

cement will gradually wear away, leaving the fine lines still sealing the weak places for a long period of time when the same can be repeated.

To consistently carry out this work to a practical degree, the services of a dental nurse are needed, and here another dilemma presents itself. It is hard to find a young lady who will take a dental course, and without a college degree, it is not lawful for an assistant to do this preventive and prophylactic work.

In conclusion I would say that prevention is a modern tendency expressed in the slogan, "Safety First."

That proper prophylactic work prevents dental caries; that it prevents pyorrhea, the disease which is causing the loss of so many teeth, and so much health, and about which there seems to be in the minds of the laity so much mystery. That prophylactic work prevents the necessity of root canal work except in some unusual cases.

That a sound tooth is much better in looks, strength, and a part of the human anatomy than any tooth devitalized, regardless of the most perfect root canal work, and that in children's teeth, it prevents a certain per cent of malocclusion.

To the patient, it is commercially profitable directly and indirectly, and last of all it is pain profitable.

I trust that the profession will work out some solution of this situation which will enable the dentist to carry out the idea of preventive dentistry to the last degree.

HARD LUCK

By an Orthodontist's Patient

I

I am having my teeth put in place,
By a very slow moving thing,
I have to wash my face,
So he can bring them back in place.

II

I don't see why my teeth are crooked,
For though I have looked and looked and looked,
My, what a joy it must be,
To have straight teeth NOT like me.

Rexford Louise, Age 9.

MODERN OFFICE APPOINTMENT FOR THE ORTHODONTIST

BY R. C. WILLETT, D.M.D., PEORIA, ILLINOIS.

SECTION I.

ORTHODONTIA as a profession is progressive. Few professions, if any, have developed more rapidly along constructive lines. This exceptional progress is due in no small respect to the fact that the profession is made up largely of young men of enthusiasm and ambition, who, not satisfied with the ordinary things of practice, decided to enter into more highly specialized work—even though that work were pioneer work. Youth and ambition and energy, together with the zeal which characterizes any pioneer, will make any work progressive.

But, while the scientific side of the profession has developed steadily and rapidly, the office appointment side has been sadly neglected. We have been so engrossed in the scientific advancement—and that is a good failing—that we have failed to spend the time and energy and thought which is necessary in securing the very best dress in which to present our skill, our profession and our service.

It is the object of this article to point out some of the unprogressive things which are still typical of some orthodontists' offices. Some of these are the mosses which were inherited from the older professions. Others represent a certain "orthodontic orthodoxy," which has no excuse for existence in our profession, but which has developed even though our profession is still young. These unprogressive things, which will be mentioned, are all in the office appointment side of our work. They are cited here, not as an excuse for a criticism, but in order that the errors of office appointment may be seen plainly. Nothing corrects an error more quickly than exposure to the light. The office of the average orthodontist is more satisfactory in appearance than is the office of the average man in other professions—but that is no argument why the office appointments of the orthodontists should not be much better than they really are. If perfection is our goal in the scientific side of our profession, there is no reason why perfection should not be our goal in the office appointment side.

The writer cheerfully confesses the appointments of his own office are far from perfect—although he is making an earnest effort to correct the defects and to supplant the previous old customs with more appropriate features.

It seems to me that of the needs of the orthodontist, the need for sensible, consistent, thoughtful office betterment is well toward the front—granting, of course, that the paramount need is always for continued study and practice in the actual constructive work of the profession. Isn't it time that a progressive profession, such as we represent, should have men with offices fitted up in accordance with the most progressive ideas of applied art and psychology? Should out-grown customs and out-grown habits hinder a progressive profession? If practical psychology can be used to advantage in working out office plans and equipment for men in other professions, can it not be used to advantage in a similar respect by the orthodontist? The very nature of our work demands it.

Why has not some writer of Mark Twain's talent and nature appreciated the possibilities for humor which are in the office appointment of the average orthodontist? For where are there more incongruities, more unsightly displays, more exhibits of abnormalities, more inappropriate wall decorations, more reckless selection and distribution of bric-a-brac, more conspicuous display of professional accomplishments, more unreadable magazines for the average patient, and more abuse of real art, than in the office of the orthodontist?

An office, according to the lexicographer, is "the place where a particular kind of business or service for others is transacted." That simple definition is sufficient for me. It follows, indirectly, from the definition, that office equipment, office furniture, office furnishings, should at least not hinder this "service for others," and that it should really be of assistance in helping to serve, for it is a substantial part of the office. But, judging from the appearance of the offices of some orthodontists, I am led to the opinion that these orthodontists have a wholly wrong idea of the real importance of the "service" side of the office.

Let us consider a few types of offices where "service" seems to have been left out of the definition. These may be partially typical of some offices of which you have some knowledge, and a mixed type may be easily found.

The most striking office is that which we might term the "museum-of-abnormal-curiosities-office." You have seen it and so have I. Leaders in the profession have been known to have just such an office—strange as it may seem. Men who have developed valuable theories for our profession, and men who have been pioneers in many branches of our work, have labored under the strange delusion that the public part of their offices must be filled with plaster models of the various types of jaws and irregularities of the teeth, plaster masks of distorted faces and other abnormalities.

Is there even the semblance of a reason for the flaunting of these figures in the faces of children who come to us for treatment? Does the presence of these unsightly, unpleasant, ghastly, gruesome, plaster figures give our patients any particular sense of pleasure or comfort when they visit and re-visit our offices? Is a child made more receptive to treatment by compelling him to look at the plaster masks of unfortunate children's faces?

I am in love with my work and I trust that all other orthodontists are in love with their work. I appreciate the absolute necessity for having plaster models and face masks—and many of them. I appreciate the importance of having these models as perfect as it is possible to make them, and to have them where it is possible to get them without inconvenience when they are needed; but I am unalterably opposed to having these figures—unsightly and disagreeable to the average patient—flaunted in the faces of patients and visitors from the walls and cabinets of the orthodontist's rooms.

Plaster of Paris models of deformed jaws may have real art in them for the orthodontist, but I have yet to find an authority on art or a lover of art who will say that there is even the smallest iota of art in these figures for the average person who visits an orthodontist's office. However, there are orthodontists who, cherishing a chalk-white plaster model of some facial deformity, would lead you to think that it is real art, and who actually place miniature models of Venus de Milo along with his own plaster creations. Plaster models of de-

formities may be just as much art to this individual orthodontist as is the reproduction of this great Hellenistic statue—but wherein did he receive the authority to force this opinion upon the patients who visit his office?

Along with the open exhibit of models we frequently see photographs of cases before and after treatment. It is an absolute necessity—if an orthodontist is to keep close record on his work—that a photograph of his patient be taken before and after orthodontic treatment. This is universally conceded. But what Chesterfieldian rule is there which makes it good taste, good manners or good sense to post these photographs in a conspicuous place around a professional office? They should be kept in a place where they may be easily found when occasions demand—but why exhibit such accomplishments?

And then there is the “Old-Curiosity-Shop-office.” You have seen it and so have I. In one corner there is a wall rack which may be a family heirloom, a cage of moth-eaten stuffed specimens of the taxidermist’s art, and a clock which isn’t running. Over against one wall is a bamboo stand, piled high with books. Then there are some sea shells—sea shells are in nature “washed twice every twenty-four hours,” but these never. There are some ancient stereoscopic slides on an old table, and plenty of dust—there is always lots of dust in the “Old-Curiosity-Shop-office.”

The center table in this office is covered with weekly magazines—magazines of a highly sensational type. And let it be said that no class of reading matter grows old faster in an office or becomes unreadable sooner than does a weekly journal. This fact, together with the fact that a highly sensational magazine is ill-suited for the perusal of a child, should be sufficient to cause us to guard against the use of sensational weekly magazines in our offices. If there are any monthly magazines in this office they are often frayed at the edges and several months old. Perhaps all these magazines are of the type which have no appeal to the children—a class which constitutes perhaps 95 per cent of the orthodontist’s patients.

There are said to be orthodontists who conduct an “Old-Curiosity-Shop-office” who are really proficient to a remarkable degree as professional men. But it is hard to believe that a man can show such a decided lack of interest in his office and then show any unusual interest in his professional work.

And the third type of office is the “I’m-a-wonderful-man-office.” You have seen it and so have I. Everything, apparently, is devised to give the patient the impression that the orthodontist is a wonderful creature. Photographs on the walls reproduce scenes along the Nile which Dr. Orthodontist saw while on a world tour a few years ago. In a glass case in his operating room are the instruments—displayed like costly silks in a department store. On the walls are various and diverse diplomas from the Homeburg high school, an academy, college, university and technical school—all of them as big as life. Then there is the certificate displayed also in a decidedly conspicuous manner, photographs of patients whom he has transformed, and other things which indicate that this particular Dr. Orthodontist is the very essence of professional skill.

All this evidence of self-praise might be well enough if it were not for the fact that there is but one thing which really advertises an orthodontist—and that is, the service which he gives. Diplomas represent a valuable thing, but

their presence on the walls of a public office does not bring cases. Travels on the Nile may have resulted in great personal good, but the average office visitor is not particularly interested in learning of the exclusive world trips which the doctor has taken. The certificate represents something valuable, but why post it like a circus lithograph on a bill board? A deed to a quarter section of land is valuable and has a place of public record, if genuine, the same as a certificate of educational accomplishments. Do we often see these deeds framed and hung on the walls to show people that the owner really has a piece of valuable property?

An office, if Webster is correct, is "the place where a particular kind of business or service for others is transacted." An orthodontist's office should be primarily and fundamentally a place of service—and the office appointment should work towards this end. The profession of orthodontia is truly progressive. Why not make the office appointment as progressive as is the profession which it serves?

(To be continued.)

THE HISTORY OF ORTHODONTIA

(Continued from page 284.)

BY BERNHARD WOLF WEINBERGER, D.D.S., NEW YORK CITY.

L. S. PARMLY, in "*Lectures on Natural History and Management of Teeth*" (1820), states that "want of attention during the period of shedding the first teeth and consequent deformity of the mouth are apt to take place."

"In all cases of irregularities, during the shedding of the teeth, the treatment to be observed is to remove the obstructing temporary teeth, and then to apply pressure, in the most convenient manner, upon the irregular tooth, in order to direct it into its proper situation. Where the permanent teeth are large, and the jaw bones have not grown sufficient to admit of their enlargement in a regular manner, they crowd and overlap each other. When the space of the jaw is not sufficient for the regular arrangement of the teeth, some must then be considered superfluous, and it will be necessary to remove one or more of the bicuspidis for each side of the jaw before the fangs are formed, (sic) to give room to the rest; the incisors must then be gradually forced into their proper places."

"The occasional pressure of the finger and thumb, if attended before the age has given too much firmness to the jaw, will invariably bring the teeth into their proper places, without the necessity of having recourse to continued pressure by means of instruments adapted to the arch of the mouth as recommended by Mr. Fox."

In 1824, M. Oudet proved that "When the secondary incisors appeared, they, being larger than those which preceded them, caused an elongation of the alveolar process, proportionate to their excess of volume, and that the first permanent molar is pressed a little backwards; he showed, secondly, that after the eruption of the fourth great molar, the first is again pressed forward into its proper place,

as there is more room, in consequence of the eruption of the second small molars, which is much less in volume than they which preceded it," thus confirming the work of Hunter and Miel.

Mr. Sigmond, in 1825, published his "*Practical and Domestic Treatise of the Diseases and Irregularity of the Teeth and Gums, With the Method of Treatment.*" This was the first work devoted almost exclusively to the subject of irregularities of the teeth.

He attributes irregularities to natural and accidental causes. Natural, (1) when they result from the jaw not expanding sufficiently to allow the teeth to form a regular circle; (2) when they are larger than the ordinary dimensions; (3) when they do not appear in their proper order and place. Accidental, when caused by negligence or improper treatment at the time of their growth.

"The causes of this very striking deformity have not been properly demonstrated by any of the authors on the diseases of the teeth, nor are there any

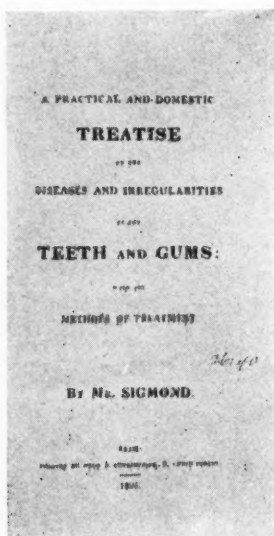


Fig. 1.—Title page of Sigmond's work, which was one of the first devoted to irregularities of the teeth. Sigmond was one of the pioneers in the use of upper and lower impressions.

directions given to prevent its occurrence; indeed, should the distortion have once taken place, no remedy has been offered, and the case has been always deemed hopeless. It is about the time of the completion of the first teeth that the projecting under jaw gradually begins to show itself, and shortly before the appearance of the second set from the surface of the gum. In communicating my practice to the public, I feel persuaded the simplicity of the remedy, as well as of the cause of the disease, will enable those who may have the care of children, to prevent so serious a deformity. In these cases, at the first commencement, it occurs that one or both of the first eye teeth in the under jaw grow somewhat longer than the rest, and are pointed on the top, so that, in shutting the mouth, the under jaw is prevented from taking its proper direction. The child not being aware of the pernicious consequences, stretches out the lower jaw, attempting in that manner to overcome the difficulty of the free action of the teeth, and constantly is seen in the act of pushing the lower jaw outwards; this

unobserved or neglected at first, grows into a determined habit, and a mischief at first easily controlled, becomes the foundation of this defect; for the jaw gradually lengthens itself out, from the articulation on each side, to relieve itself from the bad position in which it was placed, and thus the jaw becomes completely underhung."

"The remedy in the very early stage of the deformity is very easy, simple and satisfactory. Those following what I conceive an indispensable line of duty, frequently have their children's teeth examined, and will easily perceive if one or both eye teeth appear a little longer than the rest, and whether they fall in the slightest degree over the upper front teeth. Should this be the case, no time is to be lost, but with a proper file the superfluous part of the eye tooth, or any other of the under teeth, should be gradually reduced, and suitable direction given to the child to attempt to counteract the stretching of the jaw, should the habit in the least have commenced. Many cases constantly are offered to the dentist's inspection, in which it would be advisable, should all circumstances permit, to extract the tooth, which, as it is one of the shedding kind, would be done with little pain and without any inconvenience, particularly when the tooth is loosened, and the filing less easily performed. As the upper teeth should have, when the deformity somewhat advances, a tendency inwards, it becomes necessary, by artificial means, to throw them again outwards which may easily be effected by placing in the hands of the child a piece of hard wood, about four inches in length and a little flattened at the top, desiring the child to occasionally push against the inner surface of the upper front teeth; the piece of wood, properly applied, acts as a lever, and soon forces them into their natural situation. The prevention of mischief is thus completely obtained, and a very short time in the early stage of its appearance will completely stop progress of this unseemly defect."

He described fully the absorption of the roots of the deciduous teeth and the eruption of the secondary set and advised against the dangerous effects of gold wire and silken ligatures of deformed or distorted teeth.

"Notwithstanding the methods of treatment which have been recommended to guard and prevent the deformities and distortion in the growth of young persons' teeth, new cases are frequently brought to me from various parts of the country showing that children's teeth are not sufficiently attended to by parents or friends who ought to feel an interest in giving timely attention. In many instances where deformities and distortion may have been fixed, remedies are invented and brought to perfection, through long practice and experience, which restore them to regular by placing, judiciously, gold plates or shields in such parts of the teeth as will facilitate the object required. In this undertaking a dentist of skill and attention should be consulted, for those friends interested on the part of the patient or the party the time of the operation may take the amount of the expense and its probable result. An attentive examination of the state of the mouth and teeth should be the first object, the age of the patient, whether any of the shedding teeth are still remaining in any part of the upper or under jaws, where new ones will supply their places; and the dentist should decidedly settle his plans which of the teeth should require to be extracted, in order to remove such obstacles as may appear to obstruct the success of his design. Im-

pressions of both upper and under jaws are to be taken, on the plan of my late practice, which always answered the purpose to the utmost of my expectation. Daily and frequent inspection, with attention, is indispensably necessary to regulate or alter the gold plate, as circumstances may direct; and to prevent irritation, to which the gums would be liable during the time of wearing the shield, the constant use of the preservative lotion, made warm, should be attended to till the operation is completed."

Lenord Koecker (1826) states that "Irregularities of the teeth is one of the chief predisposing causes of diseases and never fails even in the most healthy constitutions to destroy, sooner or later, the strongest and best set of teeth unless

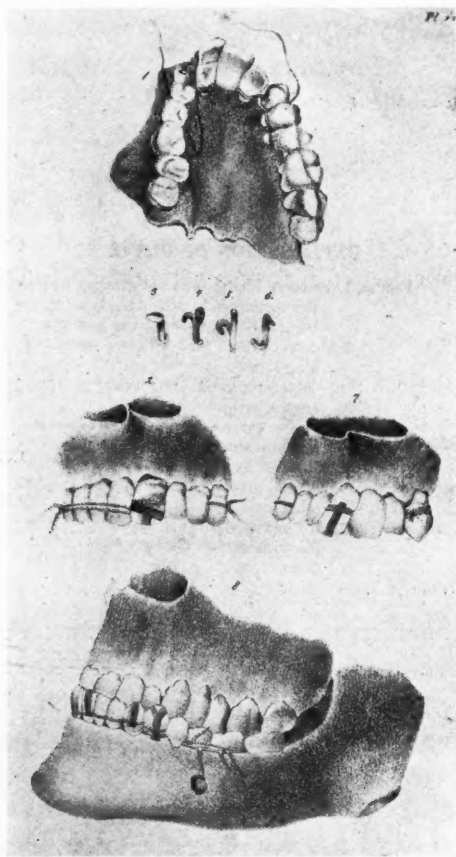


Fig. 2.—Use of ligatures by Maury (1828).

properly attended to. It is thus not only a most powerful cause of destruction of the health and beauty of the teeth, but also to the regularity of the features of the face, always producing, though slowly, some irregularity, but frequently the most surprising and disgusting appearance. It is, however, a great pleasure to know that dental surgery is abundantly provided with a remedy, and in most delicate subjects if placed under proper care at an early age, the greater portion of the teeth of the permanent set may invariably be preserved—perfect health and regularity."

As a preventive of irregularity in secondary dentition Koecker recommends the extraction of some of the permanent teeth at an early period in order to

give sufficient room for the rest. "The first molars are generally most predisposed to disease; they are least important as regards both appearance and utility, and so situated as to afford by timely removal sufficient room for the anterior teeth, as well as for the second and third molars. If these teeth be extracted at any period before the age of twelve years, all the anterior teeth will grow more or less backwards and the second and third grinders so much towards the anterior part of the mouth as to fill up almost entirely the vacant spaces caused by the removal of the first molars."

"The deformity which consists in shutting the under incisors and cuspidati over the upper, has been produced by the injudicious extraction of some of the teeth of the upper jaw, without taking proper care to secure a due proportion between the upper and under jaws. We have irregularity also when the temporary teeth are not extracted in time, and when we have too long persistence of the temporary teeth."

G. Waite, "*Surgeon-Dentists' Anatomical and Physiological Manual*" (1826), states that "Irregularities of the teeth are mostly occasioned by the pressure of the temporary upon the permanent, throwing them in the wrong direction."

F. Maury (1828), in his "*Treatise of the Dental Art*," advocated the use of ligatures. In describing his method he cautions against the slipping of the silk threads under the gums, which he avoided by fastening the ligatures to a metal in the shape of a small hook, which covered the tooth to be regulated. Another plan was to use a double hook or rings formed in such a manner as to permit one part to be caught over the end of the tooth, while the other end was free to hold strings or wire preventing same from coming in contact and irritating the soft tissues. Later a number of men, among whom was Dr. Farrar, not knowing of this plan, devised a similar method to overcome this same difficulty.

DENTAL PATHOLOGY.—Having spoken of different diseases which manifest themselves at the period of the eruption of the teeth, we shall now occupy ourselves with the examination of the diseases of the dental organs, and to proceed methodically in the classification of their various affections, we will divide them, according to Prof. Marjolin, into three principal sections. Thus in the first, we shall speak especially of the anomalies that they present in their arrangement, and vices of form of the dental arches, having made known the different anomalies that they present in their number and situation. We will examine in the second section the diseases proper to their substance; and in the third, the different affections of the part adjacent to them.

Section 1.—*Arrangement of the Teeth*.—The arrangement of the teeth (M. Marjolin) may present several kinds of irregularities. Some depend solely upon the maldirection of the teeth and others are the effect of an unnatural size of dental arch.

The first of these irregularities is called obliquity of the teeth, and may be anterior, posterior, lateral or rotary. The deciduous teeth scarcely ever present a mal-arrangement, and among the permanents the anterior teeth are more prone to it than the posterior. Several causes produce obliquity of the permanent teeth; such as, for example, a disproportion between their size and the space which they should occupy (plate xi, Fig. I); the protracted molding of some of the deciduous teeth; the presence of any tooth that diminished the space which should be filled by a new tooth; the existence of a supernumerary tooth; and organic diseases of the alveolar ridge. This evil is often announced by the setting on edge or the loosening of an adjoining deciduous or permanent tooth, and the obliquity of a tooth is often occasioned by the position of the other teeth. The dental arch sometimes becomes deformed, and, under certain circumstances, lesions of the tongue and cheek are the result.

The following is the manner by which this vice of dental conformation may be remedied.

When at the commencement of second dentition, there is manifested, anterior or posterior to the inferior or superior cuspidati, a prominence indicating the presence of

the permanent tooth, the deciduous cuspidati should be extracted whether loose or not.* The dentist should attentively inspect the eruption of the second teeth and not extract the deciduous unless he is assured that those of replacement will only have the necessary space for their good arrangement. If it be not well developed, we should extract the first bicuspid, and the teeth, then standing sufficiently apart, will not occasion the decay of each other, but will assume positions adapted to them.

The incisors and the cuspidati frequently assume an oblique position. There are dentists who pay so little regard to the symmetry of the mouth, that they do not hesitate to sacrifice a superior or inferior lateral incisor in order to allow sufficient place of the adjoining teeth to arrange themselves properly, either by efforts of nature, or by the use of ligatures. It would be better to extract in the first instance the two first bicuspid, or only one, according to the exigency of the case, and then place a ligature of raw silk of the proper size around the cuspidatus and attach it to the first molar. The ligature should be renewed daily; and in about two or three weeks the cuspidatus will have occupied the place of the tooth that had been extracted.

We should be very careful in attaching the second bicuspid to the cuspidatus alone; this latter tooth, having the stronger root, the former will be drawn toward it, and the object of the operator will be defeated. When the cuspidatus has been regulated we must bring the lateral incisor into its proper position by the same method. The space between the tooth now to be removed and that to which the ligature is to be attached for this purpose is wider by the distance of a tooth, and thus advantage will be had from the greater contractility of the ligature. The dentist who will reason on this will know the method by which teeth that overlap can be brought into natural position.

When a tooth protrudes from its socket beyond the level of the rest, we employ the ligature to restrain it, but passing it first around the tooth, then over its crown, and finally attaching it around the neighboring teeth in such manner as to produce vertical pressure upon the affected tooth (Plate XI, Fig. 7).

This species of hook has two curves; one is to be applied upon the crown or cutting edge of the tooth; the other reaches very near the neck of the tooth, and is fixed so as to prevent the ligature from slipping nearer than it is desired toward the gums. By means of this little fixture, the ligature then answers better than if its whole pressure was directed upon the root (Plate XI, Figs. 3 to 6). We advise, whenever it is possible, the placing of the ligature upon the molars, because these teeth are better capable of retaining it than the cuspidati which have the form of an inverted cone.

We shall not now speak of partial luxation of the teeth, as a means of replacing them in a more suitable position; this procedure is not always without danger. We will mention, however, that we have greater hopes of success from this operation when performed a short time after the eruption of the deviated teeth, and in a period little more advanced in life, that is to say, from eight to fourteen years. In time, whenever the obliquity of the teeth cannot be remedied, we should, as far as possible, correct the bad effects that may result from its presence. Hence, we may extract those that are too much deformed, or which injure the tongue, the cheek or lips. We may even without inconvenience excise the crowns of some of these teeth, if they cannot be extracted.

The mal-directions that the dental arches may present are, prominence, recession and inversion.

Prominence scarcely ever exists except where the jaws are too narrow to allow of a proper arrangement of the teeth. In such a case, the dental arches are very oblique, and projected anteriorly; they appear very long, and sometimes seem to follow the direction of the teeth (Marjolin). The central incisors are then projected so far forward and are so crowded together that the mouth has more resemblance to that of a beast than to that of a human being.

This mal-disposition of the teeth, of which examples are found among some nations, is sometimes hereditary; but its progress may be arrested by following the procedure which we have proposed; that is, by being particular to extract the (first) right and left bicuspid, and by the application of ligatures so to draw the cuspidati into the place previously occupied by the bicuspid. The four incisors afterwards yield of themselves, and the jaw gradually assumes a more agreeable form. The different metallic plates that are recommended for the correction of this evil, rarely produce favorable re-

*It frequently occurs that the growth of the permanent incisors is more rapid than the destruction of the roots of the temporary teeth, and that the former emerge through the gums behind the latter. In such cases the temporary incisors should also be extracted, and others must be extracted as soon as they appear.

suits; even metallic ligatures are not in such cases as valuable as the silken ones; which are more flexible and more easily adapted. We prefer raw silk or hemp ligatures; and when the teeth are brought to the place we wish them to occupy, we maintain them in that position, by means of a thread of aloes which is soaked for half an hour in hot water. This thread, one of the best ligatures that a dentist can use, distends itself, and in this manner we can employ it without fear of forcing the tooth to take a different direction.

Recession is (continues M. Marjolin) a vice of conformation opposite to the preceding, the anterior teeth are obliquely inward; it occasions deformity, difficulty of pronunciation, premature wearing away of the anterior parts of the teeth, and sometimes even ulceration of the inferior gums, rubbed by the contact of the superior teeth. This requires the filing, more or less, of the cutting edge of the teeth that cause the deformity.

Inversion of the Dental Arches.—When the superior teeth shut within the circle of the inferior, and if even their tubercles are not regularly adapted, they are said to be inverted. The anterior parts of the superior teeth are thus often worn away, while in the natural state the contrary occurs. This want of irregularity in the teeth, which we will call "*menton de vieillard*" (old man's chin) and not jimmer-jaw, may be remedied, particularly in children. Whenever the superior incisors and cuspidati alone shut behind the inferiors, we may bring them forward by means of an inclined plane, invented by M. Catalan in 1808. This instrument consists of a metallic plate attached to the inferior teeth, which projects some lines, and which is inclined in such a manner as to push forward the corresponding superior teeth. We cannot but admire a process so ingenious. In able hands it possesses great advantages; and whenever it can be properly applied, from ten to twenty days are sufficient to establish the teeth in their proper places. We have observed, that, to put this in execution, we should wait at least until the four lateral incisors have entirely come through the gums, in order to offer a sufficient hold to the plate that is to be attached.

Our methods consist in applying a sufficiently large ligature to the two inferior central incisors in such a manner that the tension of the ligature may force them back. When these two are replaced we are in like manner to replace the other two incisors; but if we wish to regulate the cuspidati, and the inferior alveolar border be more developed than the superior, it is necessary, previously, to extract the two first inferior bicuspidi; first, to allow the preceding teeth the facility of taking the desired direction, and secondly, not to prevent the lateral incisors from taking their proper situation. There is no need of employing anything to prevent the jaws from closing, as the pressure exercised by the ligatures is sufficient to prevent the inferior jaw from pressing against the superior.

The dental arches, it will be perceived, themselves form a part of the irregularities of which we treat, as, also, do supernumerary teeth.

The various operations appertaining especially to the dental art, and the different instruments proper in their performance.—Among the operations that appertain especially to the dental art, some are intended to facilitate the eruption and regular arrangement of the teeth; others consist in freeing those organs from all injurious influences, and remedying the various influences of which they are the seat, and which may occasion their destruction. We have already, in treating of the means by which we may remedy the evils of first dentition, indicated the procedures of this first class of operations; we shall now enter into the details that this important subject requires, after which we shall treat of operations of the second series. In our examination we shall endeavor to be as concise as possible.

Operations relating to the teeth, and designed to facilitate their eruption.—It has long been thought that the difficulty encountered by the teeth of the first dentition, in rising from the alveoli, depended upon the resistance offered by the gums. Under this impression, after having tried various means to soften them, recourse was necessarily to section of these parts, to give free issue to one or more of these teeth. This operation, seldom practiced, because of the capability of nature to effect the desired object, consists in an incision made upon the gums with an instrument designed for their use. This incision should, in general, be deep, if we would hope for success. The evils that may result from this operation may be subdued by emollient lotions.

Manner of directing second dentition.—Although the deciduous teeth usually assume a good direction, and arrange themselves properly upon the dental arch, as they are developed, this does not always happen with the permanent teeth, which tend to assume a defective position, either on account of the contracted space in the alveolar arch, or on account of its conformation. The permanent incisors and cuspidati are much larger than the teeth that precede them, and have, at their eruption, attained nearly their full size. It

is thought by many that permanent teeth have attained their full size at the time of the protrusion of their crowns through the alveoli. This opinion I deem incorrect, and to demonstrate this we have drawn two large inferior molars taken from the mouth of a child thirteen years old, one of which was extracted a year previous to the other. A comparison of these exhibits a material difference in their size. It is well known that at the period these teeth appear, the jaws have not attained their full size, especially near the alveolar border, which is at this time very narrow. It will, therefore, be perceived that the second teeth do not occupy precisely the same places the deciduous teeth had, but often stand a little to one side of the place the deciduous teeth had occupied, in such a manner that though the latter do not prevent the permanentes from appearing through the gums, they may cause them to take a mal-direction. The permanent teeth being larger than the deciduous, are necessarily more crowded, and arrange themselves with more difficulty.

The first measure to be adopted at the time of the eruption of the permanent teeth, is the removal of the deciduous ones. These teeth may be easily extracted; the fingers will often suffice to perform the operation, but forceps, adapted to the purpose, may with propriety be applied. We should not hesitate to extract such deciduous teeth whenever they may occasion the mal-arrangement of the permanentes. Irregularities that may result from the presence of the deciduous teeth, are always more difficult to correct than to prevent. But we should not be too precipitate in removing the deciduous teeth; first, because in their absence the jaws may contract, especially if the teeth of replacement be long in coming forward; and, secondly, because these teeth have, in some rare instances, been known to endure permanently. In these cases, however, the teeth of first dentition retain their roots entirely. These teeth sometimes remain until old age. The deciduous teeth are sometimes anterior to the permanentes, and at other times they range with them.

It often happens that the permanent teeth are developed more rapidly than the maxilla. The teeth, then, not finding sufficient space, present their lateral sides anteriorly, or are forced within or without the dental arch. In such cases the dentist should act with circumspection, and on observing the maxillary bones to increase without facilitating the regular arrangement of the permanent teeth, he should endeavor to correct their mal-position. Teeth, irregularly arranged, are always unseemly to the view, do not admit of being properly cleaned, and are more disposed to decay on this account.

The best mode of correcting slight irregularities, is to extract one or two to preserve the rest. In this manner, which may at first appear harsh, the teeth being rendered less crowded will be less liable to decay, and having thus plenty of room, will naturally assume a regular arrangement. We may hasten the approximation of the irregular teeth, if necessary, by passing silken ligatures around such of the teeth as should be inclined toward each other.

As it is in general the anterior teeth that are badly arranged, it might be supposed that one of these should be extracted; but the approach of these toward each other would not authorize such procedure for the sake of symmetry. In such cases, according to the example of Garriot, the best practitioners extract one, two, three, or four bicuspid, according to the space required in the anterior arch. We may also extract the cuspidati to effect a handsome arrangement of the teeth, as it is known that these teeth are often irregular. It is, however, not common for us to have recourse to this; first, because their presence is more essential to the symmetry of the mouth than that of the bicuspid, and secondly, because, having stronger roots than the bicuspid, they serve as supporters of the anterior teeth.

If on the contrary, we extract a bicuspid, there will still remain one of the same class, and thus the mouth will not be disfigured; its situation in the middle of each side also permits the teeth to separate from each other with greater facility.

These procedures are always easy, only requiring judgment and skill on the part of the dentist.

Mode of correcting irregularities.—The mal-arrangement of the teeth arises from their inclination inwardly, outwardly, or laterally, or from disorder occasioned by their transposition. We should endeavor to remedy these irregularities by all possible means. Success in such cases will depend entirely upon the intelligence and ingenuity of the practitioner.

In general the means should act slowly, and be continued, without occasioning pain, and, as the teeth that have taken a bad condition, may always be removed with little effort, provided it be persevered in for a sufficient lapse of time, it suffices for accomplishing the desired purpose, to place a ligature around the neck of the deviating tooth, and

then attach this ligature to a tooth at a proper distance from that to be removed. If, for example, we are required to remove a central incisor, situated anterior to the other teeth, we should pass a ligature of proper size around the anterior part of the neck, then bring it around the internal faces of the two cuspidati, and tie around their anterior faces. If the ligature be changed, two or three times a day, and tightened at each time, the adjustment of the tooth can be effected in two weeks at most. The tooth should be retained in its new position for some months by means of a ligature, or, which is better, with a thread of aloes, until the alveolar walls around the tooth shall have attained sufficient solidity to retain it in its place. We employ in this operation small crotchets or hooks, to prevent the ligatures from slipping down on the gums. This mode of regulating the teeth is simple and sure.

Gold or platinum plates have also been used for this purpose, the manner of application of which was somewhat difficult, but this practice has grown into disuse, as it was not always practicable, and the results were not always as prompt and efficient as by the mode already described.

When persons have been unwilling to endure the inconveniences arising from the use of the ligature or plate, an operation still more painful has been resorted to. This consists in luxating the tooth; but this operation should only be performed by an able dentist, since it is not unattended with inconveniences. The vitality of the tooth may not only be destroyed in the operation, the gums lacerated, the alveoloperiosteum injured, and the alveolar processes fractured, but the tooth itself may be broken; and it may happen that he will extract it in spite of every precaution.

CHAPTER IV.

It is, therefore, very essential to know that mal-configuration of the denture may be occasioned: First, by a defect in the conformation of the jaw; Second, by the simple want of their development depending on the health of the individual; Third, by an excess in the dimensions of all the teeth, though the jaws are in other respects well formed; Fourth, by the rapid development of the dentition of one jaw, and the delay in that of the other; Fifth, finally by the too great size of the teeth of one jaw, which do not harmonize with those that are opposite them.

The different configurations, both of the jaw and teeth, are susceptible of many varieties which experience alone can enable us to distinguish.

It appears to me, that it is from not having sufficiently studied these, that so many dentists have adopted a uniformity of practice that savors very much of routine.

I shall not here speak of deviation of the teeth that proceeds from a congenital fault of the jaw. We see that this defect, called hair-lip, by which the palate circle is frequently divided, necessarily carries along with it an irregularity in the arrangement of the teeth; I will only observe, that in the operation which this defect necessitates, the surgeon should have in view, not only re-establishing the continuity of the lip, but also the regulating, as much as he is able, of the dental arch.

Not only one of the jaws may be configured in a various manner, but sometimes both are malformed; the superior is defective in form: 1st. When the alveolar arches are compressed on the sides, and the anterior part is carried much forward. This pre-disposition is frequently accompanied with a deformity of the bones of the nose, which are pinched together, so as to resemble the beak of perroquet. The palate, instead of delineating a perfect arch, presents a sort of triangle somewhat like the arcades of Gothic architecture. This conformation determines the approach of the anterior teeth that are crowded together at the time of their shooting up. I have frequently observed whole families, in which this appeared to be hereditary. 2nd. The palate may be malformed in a contrary manner, and present an arch much flattened and very spacious, but then the arrangement of the teeth will not suffer; for instead of being crowded, they will be separated from each other. I will here again remark, that almost all those that are afflicted with rickets, have good palates, which proves that rickets does not prevent the development of the bones of the jaw, nor of those that are found enclosed in them.

The defects of the inferior jaw are of the same kind; either it is compressed in its lateral parts, and then the anterior teeth are pressed together and placed some before the others; or the circle that it describes is too great, which causes the inferior teeth to come forward, raise the lip, and cross the superior incisors and conoids, by pressing before them whenever the mouth is closed, just like what may be observed in the denture of dogs.

In certain families, this predisposition is frequently hereditary. It is very common

among particular nations, as the Scotch, the English, etc. The mouth indicates it in earliest infancy; it is also the lot of some subjects in whom the general ossification is with difficulty effected, such as children of a very mucous temperament; second dentition, by determining a happy afflux of the osseous juices towards the jaws, sometimes diminishes it, but most frequently increases it.

Thus we see the defects of conformation are more or less decided, and are relative to a faulty development of either of the jaws, or sometimes even of both.

Defects in the configuration of the denture may resemble those in the conformation of the jaw, but the habit of carefully observing, will prevent the surgeon being deceived.

Thus the inferior teeth being too large, or shooting up much sooner than the superior, the rapid increase of the lower jaw allows its incisor to be carried forward.

During this time, the superior jaw has remained inactive, its incisors finally show themselves; but those that meet them from below at each occlusion of the jaws, continually push them towards the concave side of the dental arch: hence results, *either a retracted superior denture, or a projected inferior one*, which, it is very essential to distinguish from that vice of conformation which causes the chin to protrude, so as to resemble a shoe. We may remedy the two former, while it would be dangerous, or at least useless, to attempt to correct the latter.

I thought our attention should the more be fixed upon this subject, as most authors have not sufficiently dwelt upon it; M. Duval has spoken of it, and, though he is too brief on this point, yet he cannot be consulted without interest.

As to the rest, real defects of conformation are of very rare occurrence. The jaws may be very well formed, the palate present a finely rounded arch, the inferior jaw describe an arc of a perfect circle, and the teeth not larger than in the ordinary state; and still they may be irregularly arranged. Here then, is simply a want of development—an organic defect.

In like manner, the jaws may be sufficiently developed, though the teeth are badly arranged; in this case, the superordinary or supernatural size of these small bones occasion the irregularity of the denture. Thus every traction that may be practiced on these organs will be imperfect, unless we previously facilitate their arrangement by the use of the file, if their crowns are too large and their roots of no more than the ordinary size; or by sacrificing one of the teeth, without the range, if the crowns and roots are alike too great.

We shall return to these particular points, when treating of the natural method of arranging a set of teeth at the period of shedding the temporaries.

S. S. Fitch, "*System of Dental Surgery*" (1829) says, "Irregularity is due to want of simultaneous action between the increase of the permanent teeth and the decrease of the temporary, by the absorption of their fangs to the greatest size of the permanent in comparison with the temporary."

He quotes Fox at great length in regard to the treatment of irregularities and seemingly bases his own practice on the directions there recorded, for he does not make any essential additions to the methods or practice of the older author.

As to this author's advice for the use of the file, he says: "The direction of Mr. Fox to divide and separate the teeth when merely crowded and not carious, has, by its injudicious adoption and indiscriminate performance, been productive probably of more injurious consequences than any mode of practice, or any direction ever given by any writer or practitioner of dental surgery. Almost every dentist who has read Mr. Fox, has adopted and followed this practice. The pernicious consequences of it are seen almost every day."

He has classified malocclusions similar to Fox, which is as follows:

"There are four states of this kind of irregularity. The first, when one central incisor is turned in, and the under teeth come before it, whilst the other central incisor keeps its proper place, standing before the under teeth."

"The second is, when both the incisors are turned in, and go behind the under teeth; but the lateral incisors stand out before the under teeth."

"The third variety is, when the central incisors are placed properly, but the lateral incisors stand very much in; and when the mouth is shut, the under teeth project before them and keep them backward."

"The fourth is, when all the incisors of the upper jaw are turned in, and those of the under jaw shut before them. This is sometimes occasioned by too great a length of the under jaw, in consequence of which it projects considerably forwarder than the upper jaw. But the majority of such cases originate entirely from neglect, and may be completely remedied by early assistance."

"The time to effect any material alteration in the position of the teeth is before thirteen or fourteen years of age, and as much earlier as possible; for after that time the sockets of the teeth acquire a degree of strength, and the teeth are so fixed that they cannot be moved without much difficulty. If the

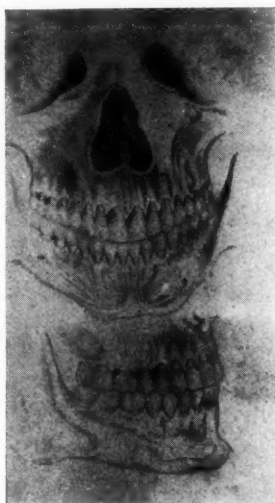


Fig. 3.—Thos. Bell's conception of occlusion of the teeth (1829).

irregularity be left to a much later period, it becomes a great deal more difficult to produce any alteration, and frequently all attempts are fruitless."

"To remove the kind of irregularity above mentioned, two objects must be accomplished; one, to apply a force which shall act constantly upon the irregular tooth, and bring it forward; the other to remove that obstruction which the under teeth, by coming before the upper, always occasion."

"The first of these objects may be attained by the application of an instrument adapted to the arch of the mouth, which, being attached to some strong teeth on each side, will furnish a fixed point in front, to which a ligature previously fastened on the irregular tooth may be applied, and thus, by occasionally renewing it, a constant pressure is preserved, and the tooth may be drawn forward."

"The second object, that of removing the resistance of the under teeth, must be attained by placing some intervening substance between the teeth of the upper and under jaws, so as to prevent them from completely closing, and be an obstruction to the coming forwards of the irregular tooth."

J. P. Clark, in "*A New System of Treating the Human Teeth*" (1829), states: "Irregularity may arise from too premature extraction of temporary teeth. Disproportion between the teeth and the jaws may be occasioned by a natural conformation of the parts or may be the unnoticed effect of accident, for there are seldom found any such disproportion and consequent irregularity in the teeth of men and animals in a wild state."

In 1829 Thos. Bell—"*The Anatomy, Physiology, and Diseases of the Teeth*"—in referring to the correction of irregularities has this to say: "There is not a subject connected with that branch of practice of which the present work professes to treat, which has given rise to such gross charlatanism, or to so much gratuitous cruelty, as that which regards the treatment of irregularities in the permanent teeth. Had I only to lay down the general principles upon which cases of this kind are to be treated, they would occupy but little space for they are few and simple;—but so universally have the practices obtained which I shall have occasion to deprecate (and which must have originated either in the most culpable ignorance, or in motives more disgraceful still than ignorance itself), that some examination of the directions of former authors appears necessary, in order to remove, as far as possible, the erroneous impressions which have thus been made."

"Irregularity, which, in a practical point of view, is only referable to the adult teeth may be considered as either temporary or permanent. There are two kinds of temporary irregularity:—the first occurs from want of concert between the absorption of the temporary and the advance of the permanent teeth, by which the latter are forced into an unnatural position, and come through the gums either before or behind the former; the second arises from the difference in size between the temporary and permanent incisors and cuspids, and is subsequently obviated by the loss of the temporary molars, when succeeded by the bicuspid which are smaller and which consequently allow the necessary increase of room in the front of the mouth. Permanent irregularity originates in the want of exact proportion in the extent of the maxillary arch, and the size of the permanent teeth. That which I have called temporary irregularity also assumes a permanent character when the irregular teeth have remained so long unattended to, as to have become fixed in their unnatural situation or are retained by it, by the pressure of an antagonist tooth in the other jaw. Malformations of the jaw and the occurrence of supernumerary teeth, are also occasional causes of permanent irregularity."

"It were well if the intentions of nature were more attended to in the regulation of the teeth than has generally been the case. In this as in every other circumstance in which surgical treatment is required, it should be recollected that the legitimate object of the surgeon is confined to the application of remedies in diseases, or the regulation of the natural functions when they are deranged, and it is not to be supposed that a process of so much consequence to the comfort and health, and essentially connected with a function so important as that of digestion, should be imperfectly provided for as to be constantly in need of such harsh and unnatural interference. * * * There are other and more important reasons for avoiding the early removal of the deciduous teeth. It will be remembered, that the connection between the temporary tooth and the suc-

ceeding permanent one continues to exist by means of the cord extending from the sac of the latter to the neck of the former, which must be torn through, if the temporary tooth be removed before the sac is absorbed, until, therefore, the secretion of the enamel is perfected which is not the case until a short time before the edge of the tooth passes through the gum, the extraction of the temporary tooth may very probably interfere with the healthy and uniform deposition of this substance."

"There is yet another evil resulting from this empirical mode of treatment which has hitherto been unaccountably overlooked, but which should be impressed on the mind of every practitioner to whom the care of the second dentition is being arranged in a continuous and even series, around the arch of the jaw, tend to preserve its form and even its contracting during the growth of the child, when every part of the body is undergoing continual alteration, in form as well as in size. By the time that these teeth have become loosened, the permanent ones, in their natural course of the change, are ready to fall into their place and thus the correct form of the jaw is preserved, but, if the temporary teeth be removed before the permanent ones are so far advanced as to be ready to occupy their situation the support of the alveolar processes being thus lost, the arch of jaw contracts, and when subsequently the permanent teeth are fully formed there is not room for them to range in their proper situation. Thus the operation which was intended to prevent irregularity becomes the cause of its occurrence and that in its very worst form; producing a great want of accordance between the size of the teeth and that of the jaw."

"A favorable prognosis may, with tolerable certainty, be formed of the ultimate regularity of the teeth, as far as it depends upon the relative proportions between them and the maxillary bones, where the following circumstances are found to exist at the period when the second dentition commences: 1st. If the maxillary arch be well formed, sufficiently expanded, and of a semi-circular form rather than elliptical. 2nd. If the temporary teeth although broad, are a little separated from each other especially if, having been originally somewhat crowded, they have been gradually acquiring more room during the last year or two; as this indicates a disposition in the jaws to expand. 3rd. If the first permanent molars appear to be formed and of moderate size. 4th. If there be no considerable prominence of the gum behind the temporary teeth, indicating that the permanent ones are advancing the situation. 5th. If the parents and family in general especially those whom the child resembles have the maxillary arch broad and well formed and the teeth regularly arranged in proportion to the degree in which these circumstances exist, a more and less regular state of the teeth may be anticipated."

"Permanent Irregularity.—The natural periods and order in which the teeth are usually changed, and which have already been detailed are rarely accompanied by any deviation from the regular arrangement either considerable in its degree or permanent in its degree or permanent in its duration provided there be no want of congruity between the size of the teeth and the expansion of the jaw. Now and then, however, when the shedding of any of the temporary teeth has been so much retarded as that the permanent ones are not only forced out of their situation but retained there by the teeth of the other jaw acting upon them

whenever the mouth is closed, irregularity of the very obstinate kind is produced. Still, the most usual cause of permanent irregularity is the actual want of sufficient room in the jaw for the ultimate regular arrangement of the teeth; and this may occur either from disproportionate narrowness of the jaw (whether from original formation, or produced by the too early removal of the temporary teeth), or from preternatural size of the permanent. The former is incomparably the most frequent."

"The principles upon which both the species of irregularity just described are to be treated, are generally similar; the only difference is that their application to those cases in which the jaws close in such a way that the teeth of one prevent those of the other from being brought into their proper place, must be rendered effectual by obviation of the interference, which is to be done either by the actual removal of the interfering tooth, or which is more generally called for by temporarily preventing the mouth from being closed."

Instead of the straight gold bar described by Fox, he advocated the use of one accurately stamped to a brass cast of the upper teeth, "so as to accommodate it to all the depressions and elevations presented by the series of the teeth, except that it should stand a little forward and opposite to the irregular tooth; to such a distance, in fact, as to allow of its being brought quite into its place

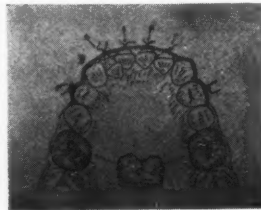


Fig. 4.—Appliance and cap devised by Bell.

before it would come into contact with the bar. This method of forming the bar, by fitting it accurately to the arch of the teeth, contributes very much to its firmness and comfort and prevents, in a great measure, its interfering with the lip. It should be so long as to extend just beyond the first bicuspid on each side; two small holes are drilled through it at the part corresponding to each of those teeth—to the irregular one—and, if necessary—to any other to which it may be thought desirable to fasten it for greater security. Ligatures, consisting of strong silk twist, are passed through these holes, the ends of each being brought in front, and the bar is thus fastened, first of all to the bicuspids, and then to the irregular tooth. It is necessary that the ligatures should be applied quite up to the necks of the teeth, or they will slip off, and they should be drawn very tightly, especially that around the irregular tooth. As a part of the bar stands forward from the tooth, and as, although strong, it should be elastic, there will be a constant force acting upon the tooth, tending to bring it forward."

"The closing of the jaws is to be prevented by a method less complicated, and less liable to derangement, as well as firmer and more comfortable to the patient than the one of Fox's. It consists of a simple cap of gold, made to fit very accurately, to a molar tooth either of the upper or lower jaw. I have usually found the former the most eligible. The cap should extend as far as the

neck of the tooth on each side, and should be accurately adapted to all the irregularities of the surface, by being stamped between a brass cast of the tooth and a hollow cast of lead. It is made of gold, containing such a portion of alloy as to render it hard and elastic. When this cap is adjusted, the edges that are adapted to the neck of the tooth are bent a little inwards, so that some force is required to press them over the convexity of the crown; they will then spring into the depression at the neck, and the cap will remain perfectly firm in its situation, if accurately made and properly applied. The thickness of the surface must be sufficient to prevent the lower front teeth from interfering with the operation of bringing the irregular upper one forward, by means of the bar."

"The ligatures should be replaced about every other day, and the bar should be wholly removed whenever this is done, in order to cleanse it; as otherwise it becomes offensive and irritates the edges of the gum."



Fig. 5.—One of the first designs of operating chair, used by James Snell in 1831.

Early treatment is advocated and should be begun before the twelfth year or earlier. His work contains many illustrations, including excellent drawings of the jaws and teeth, in normal articulation, with the cusps interlocking.

Jos. Harris (1830)—"*A Familiar Treatise on the Teeth*," and John Winckworth (1831)—"*On the Teeth*," both attribute irregularity of the teeth to supernumeraries.

Leszai (1830) described, in the first half of his work, "*Die Dentition Anatomisch Physiologisch und Pathologisch Betrachtet*—," the development of the dental arches and first dentition. The second part treats of the growth of the arches, in which he discusses the treatment for irregularities. There is little that is new, his work being mostly a repetition of the thoughts of his predecessors. However, he clearly outlines normal articulation, or what would now be considered occlusion.

John Nicholles (1833)—"*The Teeth, in Relation to Beauty, Voice and*

Health." "It has been asserted by many writers that by retaining the two lateral temporary incisors we shall contribute to the expansion of the jaw; this I deny; and, if ever I recommend that they should be retained, it is when the new set being small, expansion is not required because there is no danger of lateral pressure."

"A recent author of considerable talents has mistakenly affirmed, that the temporary set should by no means be extracted until the new teeth are ready to take the place of the old. It is hardly necessary to show the fallacy of such an opinion, when it is considered that the natural and proper circle, formed by the adult teeth, is many degrees more expanded than that which contained the temporary set."

"Shortly afterwards a similar process goes on in the upper jaw; the central temporary incisors become loose, giving token of the speedy appearance of the permanent teeth, and, as a general rule, the safest practice is to extract the four temporary incisors."

"In a few months subsequently to the central permanent incisors having taken their proper place, it becomes of the utmost importance to attend to the forthcoming lateral incisors of the lower jaw; shortly afterwards, and, in many cases, at the same time, the lateral incisors of the upper jaw appear. To make room for their proper development, it is requisite to remove the fifth and sixth teeth,—that is, the two temporary cuspidati in each jaw, when the child, as far as the four permanent front teeth in each jaw are concerned, may be considered to be in a state of perfect safety. No deformity in their arrangement can now take place, unless arising from some malformation of the teeth or of the jaw, entirely beyond the previous control of the dentist."

"It is now that the result of the past attention will make itself visible, and in the most pleasing and palpable form. The mouth, certainly not the least important feature of the face, will gradually mold itself into harmony; the teeth will be beautiful from their regularity; and the chin, though in a less degree, will be acted upon by the same influence. Indeed the change that takes place under these circumstances is so great, that I can hardly expect it will be credited in its whole extent by those who have not witnessed it. With this conviction, I abstain from saying all that my own experience would warrant me in advancing, but I must be allowed to repeat that inattention to the teeth at this critical period may be destructive not only of beauty but even of the health itself."

"It should, however, be considered as an established rule, that the projecting cuspidati themselves should never be extracted, unless when the deformity has been allowed to extend to their full development, and is consequently irremediable. In such cases we must, as the least of evils, consent to their extraction, both on account of the hideous appearance, and in order to get rid of the pressure, which else would infallibly produce caries upon the other teeth."

"The evils, however, attendant upon this decision, and it would be wrong to conceal them, are really great. The beauty and character of the countenance are materially affected by it."

"With regard to the correction of deformities, it is unnecessary to point out the numerous mechanical contrivances for this purpose, nor would they be understood without the help of plates. My readers, however, may rest satisfied

that deformities of every kind are to be remedied, and that success is not confined to a very early age, as has been asserted by most writers on the subject. I speak positively, for I speak from experience, having succeeded with patients even after their twenty-fifth year, and that too in cases which had been previously pronounced beyond the power of art to remedy."

"Before I conclude this division of my subject, there is one point to which I am particularly anxious to call the attention of my readers, the practice being so general and the mischief consequent upon it so great and so inevitable; it regards the use of ligatures or wires—never on any account allow them to be fastened round the new teeth in the application of the mechanical means to correct deformity; let the operator say what he will, the result must be their destruction."

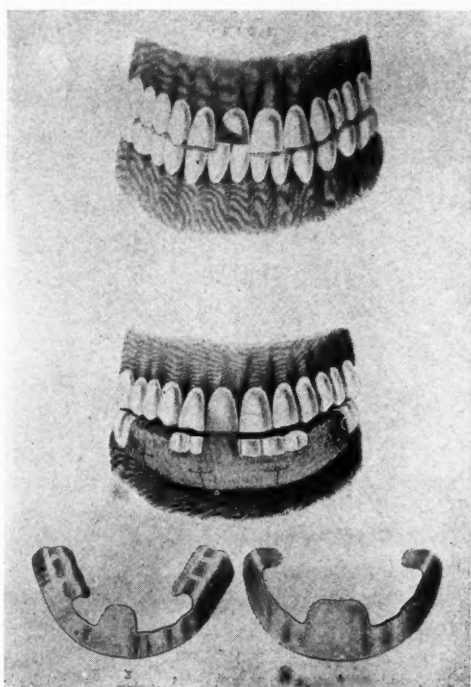


Fig. 6.—Appliance devised by Wm. Robertson in 1834 for correction of irregularities of the teeth.

David Jobson (1834)—*"On the Teeth."* "Irregularity is due to the smallness of maxillary arch and great size of permanent teeth and their situation, part on inner and of others on outer side of temporary teeth."

He advocates preserving the teeth as long as possible, seldom extracts, and in general follows Hunter's method. It is interesting to note his statement regarding the first molars,—they being rarely irregular and almost always assuming a normal position. He also states that the treatment of all cases should be before the patient reaches his thirteenth year (which is contrary to Hunter and others) as the roots of the teeth are then formed and difficult to move. In treating irregularities, he claims that a crowded condition of these organs will take place in those cases where their dimension exceeds those of the jaw, notwithstanding every care of the dentist.

Wm. Imrie (1834)—“*Parents’ Dental Guide.*” “Irregularity is due to the want of development of jaw-bone. Thumb sucking, intemperance of various kinds combined with artificial modes of living introduced by civilization and sudden transition from heat to cold to which the teeth are subject—all these have a tendency to prevent the development of the bones—a similar state of the teeth and jaw-bones is induced when attempts are made by the inexperienced to regulate them by the extraction of teeth of the upper jaw and neglecting to remove an equal number in the lower.”

Wm. Robertson (1835) in his work, “*A Practical Treatise on the Diseases of the Teeth,*” does not add anything of importance to the correction of ir-



Fig. 7.—Title page of F. C. Kneisel's work (1836).

regularities of the teeth, although he devised an appliance, based upon the inclined plane, that varied greatly from those of his predecessors.

Fig. 1 represents one of the central incisors of the upper jaw shutting within those of the lower.

Fig. 2 shows the method by which this deformity is remedied. A gold plate is accurately fitted and firmly secured to the lower range of teeth; it inclines inwardly across the cutting edges of the teeth which inclose the upper incisor. In shutting the mouth the posterior surface of the irregular tooth acts against the inclined surface of the plate, and by the pressure thus produced the tooth is gradually moved forward into its proper situation. The plate at both ends encloses and rests upon the grinding surfaces of the bicuspid which bear it up

against the pressure of the irregular tooth, and prevents the lower edge of the plate from being forced against the gums. The same principle is adopted whether there are two or more of the upper teeth shutting within those of the lower jaw.

Fig. 3 is a view of the plate separated from the teeth.

Fig. 4 is a plate adapted for two front incisors similarly situated to the one described. In this case the bicuspid have not yet made their appearance; it therefore becomes necessary to support the plate against the molar teeth, and to prevent the lower edge of the plate in front from pressing against the gums. It is also supported against the cutting edge of the lower incisors.

John Mallan (1836)—"*Practical Observations on Physiology and Diseases of the Teeth*," remarks that as the adult teeth are larger as well as more numerous than the milk teeth, it is obvious that they require a great deal more room, and when absorption of the latter does not progress equally with the growth of the former, the new teeth are crowded and are apt to be forced out of their natural position by the resistance of the old. Again, if the permanent prove, as they sometimes do, disproportionately large in comparison with their predecessors, the jaw may not be sufficiently extended to admit of their being arranged in order, in which case some overlap the others and considerable deformity is occasioned."

F. C. Kniesel, in 1836, published his book, "*Der Schief stand der Zahne*"—the first special work in the German language devoted to malocclusion of the teeth.

In this work, we find the beginning of the series of classifications which followed in rapid succession. According to Kniesel, the anomalies of the teeth were classified in two groups, partial and general. The first dealt with malposition of individual teeth and the second with the malrelation of the arches.

We here find the first application of the chin cap as used until recently in orthodontia, and perhaps for the first time an attempt at making and using a removable appliance.

We also find in Kniesel's work the introduction of another important factor into dentistry and one that had the greatest influence in furthering the development of orthodontia, namely, the use of plaster models.

In the section devoted to treatment, we find the first attempt at making metal dies and counter dies, and the introduction into prosthetic dentistry of another material beside wax and plaster of Paris. Kniesel described in detail this system which is closely adhered to today. Bell's method was, as already described, different.

Having found this work so interesting, and believing that it will prove so to the readers, I decided to incorporate the whole in this history.

INTRODUCTION.

Of all the deformities which disfigure the beauty of the human countenance, which hinder in the harmony of enunciation of speech and song, which influence health and interfere with one's vocation, there is none so significant as the adverse position of the teeth. All features and characteristics may be ever so beautiful and perfect, yet a charming appearance is very often marred by distorted teeth.

These important facts are, however, often overlooked, although they deserve consideration; as experience teaches daily, that, until very recently, one troubled oneself very little about the causes of distortion, and the various ways of correction.

How many cases are there of a very beautiful face being spoiled by distorted teeth, which cause lips to protrude and which interfere with the closing of the mouth.

A very interesting case of this kind came to my attention recently. It deals with a 12-year-old boy, whose eye teeth projected outward so far that they pushed the upper lip away to one side. The four incisors were so far backward that the entire row of lower teeth rested beyond them in biting, whereby the face of the boy was so disfigured that the chin projected outward entirely too far and approached the nose, the upper lip was flattened in the middle, the region of the cheeks was swollen in appearance, and the space between the eyelids was made narrow.

Plate II, Fig. 1, [Fig. 8], shows this face with distorted teeth, and Plate II, Fig. 2, [Fig. 8], the same after I extracted the two eye teeth and brought the four incisors outward. The improvement in this child's face was so remarkable that his father did not recognize him readily.

My practice allows me the opportunity of observing all kinds of anomalies in the positions of teeth.

The aim of this work is to arouse the attention of parents to the importance of correcting the teeth and secondly, to make my method common to all.

CHAPTER I.

DISTORTION OF THE TEETH.

1. *Regular Position of the Teeth.*—The mouth of a human being consists of thirty-two teeth, arranged in two semi-circles, each containing sixteen teeth, and shaped in such a way that—

1. When biting (by putting strips of paper between the back teeth) the front part of the upper row of teeth should project from $\frac{1}{4}$ - $\frac{1}{2}$ over and in front of the lower row.



Fig. 8.

2. The crowns of the lower incisors lie against the somewhat concave inner surface of the upper incisors.

3. The remaining eight back-teeth rest perpendicularly upon one another on both sides; these positions are made clear on Plate III, Figs. 3, 4, 5, 6, [Fig. 9], where a side and front view show the position of the teeth.

In all individuals, whose teeth are in the position of the above order, distortion of teeth is impossible.

2. *Irregular Position of Teeth.*—The irregular position of the teeth, which one understands under this heading, generally occurs to the sixteen front teeth, generally to the eight upper teeth, whose deciduous ones (by nature) did not stand perpendicular to one another. Irregularity is seldom noticed among the sixteen back teeth, which are perpen-

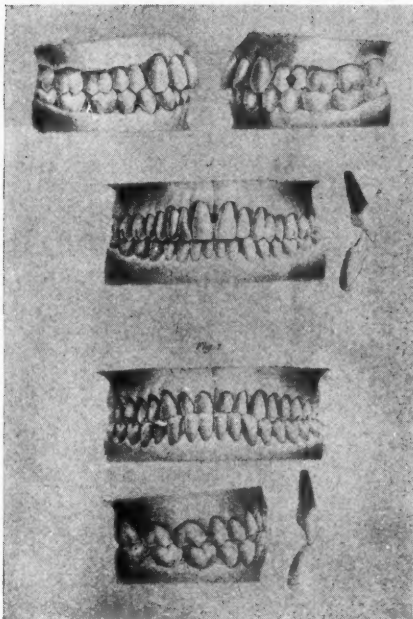


Fig. 9.

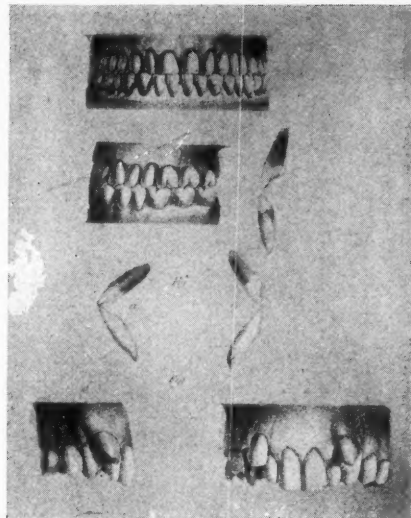


Fig. 10.

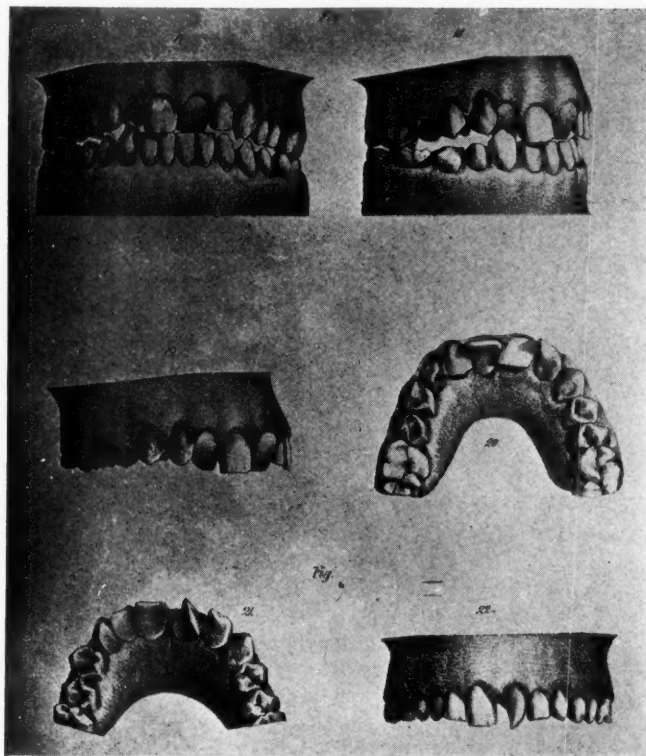


Fig. 11.

dicular to each other. Therefore, all teeth that are without the half circle, or which project inward, and are in an oblique or crossing position, are said to be in an irregular or distorted position.

(A) *General Distortion*.—The following are the most causes:

1. Where the upper row of teeth project outward.
2. Where the lower row project beyond the upper row of teeth. (Plate III, Figs. 7, 8, 9.) [Fig. 9.]
3. Where both rows of teeth are perpendicular to one another. (Plate IV, Figs. 10, 11, 12.) [Fig. 10.]

To this class belongs also the peculiar case of both rows of teeth being in a distorted position, both being turned inwardly upon one another. (Plate IV, Figs. 13, 14.) [Fig. 10.]

(B) *Partial Distortion*.—The following are to be classed among the above heading:

1. Where single teeth of either jaw are out of position. (Plate IV, Figs. 15, 16.) [Fig. 10.]
2. Where single teeth project inward or outward. (Plate V, Figs. 17, 18, 19, 20.) [Fig. 11.]
3. Where single teeth appear to be turned. (Plate V, Figs. 21, 22.) [Fig. 11.]

CHAPTER II.

ABOUT THE CAUSES OF DISTORTION AND THE TREATMENT.

Among the main causes, which are at the bottom of this deformity, the most important one, it appears to me, is the abnormal growth and position of the jaws, especially

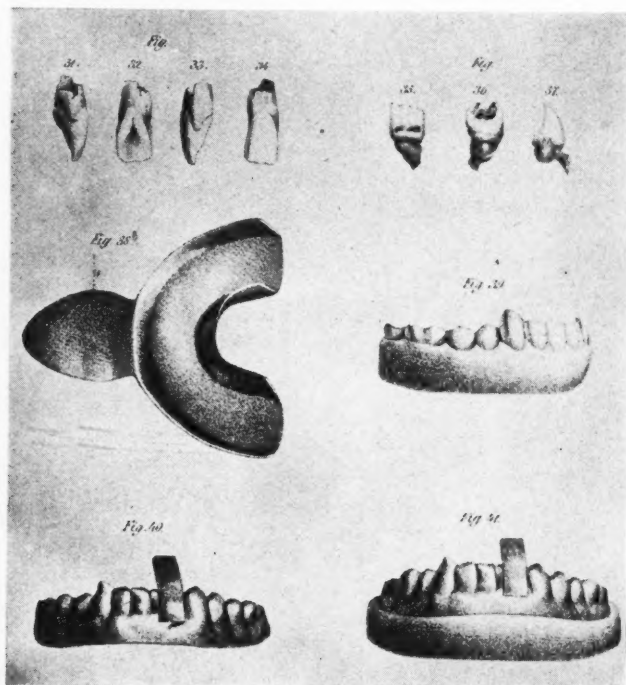


Fig. 12.

the teeth progression; this is often transmitted from one generation to another. Therefore, the matter of teeth should be looked after from the time of birth. After the beginning of teething, and after the front teeth are grown, it is useful to give a child some sort of elastic to nibble and bite at, by means of which the regular growth and development of the jaws and the correct position of the teeth are brought about. If the child is grown enough, it is well to give it a piece of hard bread to nibble at. The neglect of this caution is very disadvantageous for the correct position of the teeth. Also the neglect of the second teeth is a cause for distorted teeth. During the time of the second dentition, between the ages of seven to fourteen, and sometimes later, great care must be taken for the timely extraction of the deciduous teeth. The extraction must also not be done too soon or without prudence, because one runs the risk of allowing the second teeth to erupt

too soon, and thereby injuring the proper development and stretching of the alveoli. (Plate VI, Figs. 25, 26.)

The causes of distorted teeth are often the irregular, narrow space of the jaws, unusual width of the teeth, too great development of the teeth and other similar causes. (Plate VI, Figs. 27, 28, 29, 30.)

CHAPTER III.

DETERMINATION OF AGE, BY WHICH THE REGULATION OF DISTORTED TEETH CAN BE BROUGHT ABOUT.

In order to regulate irregular or distorted teeth, one must understand what course of procedure to take in order to bring the teeth into perfect line and in good position. As this can only take place under certain conditions, and can only come about through a certain fixedness of the teeth, this operation can only be successful at a certain age, and especially only where,—

1. The "roots" of the teeth are still wide open and are not quite closed at the apex, which allows for development at the end of the teeth and space for the nerves. (Plate VII, Figs. 31, 32, 33, 34.) [Fig. 12.]

2. Where the alveoli are not completely hardened and inflexible.

3. Where the teeth have the necessary pressure, and have reached such a fixedness, that they could be moved properly and without injury, with the root, otherwise the root would remain in the old position, as I have often observed. (Plate VII, Figs. 35, 36, 37.) [Fig. 12.] Therefore, it is very necessary that the age be taken into consideration.

In this respect I have found that the regulation of a tooth is most practical the second year after its eruption; one should always let the time for regulation be judged by the dentist, since it is sometimes advisable not to begin regulation too soon. But the most favorable age is from eight to sixteen.

Indeed, this operation is also advisable after the age of sixteen, although it is more difficult and takes a longer time. Yet they should not be regulated too late in life as there is great danger of permanently loosening them.

CHAPTER IV.

ABOUT THE OLD WAYS OF REGULATING DISTORTED TEETH.

Until now there was really one method,—to be exact, two; for both depended upon loosening and pressure of the distorted teeth. The one is obtained little by little, the other at one time. In one, one uses ligatures of twine and silk, besmeared either with or without the "Capal?" of the pine tree, also called "Fite?", or crines de florence; or of silver or platinum wire. This method, with its variations is recommended by Geraudly, Hunter, Brunner and others.

For the second treatment, Fauchard's method is made use of. The tooth is quickly loosened, brought into its proper place and is fastened there with a silver wire.

Both methods are of great value on account of the number of years they have been in practice.

An adjoining tooth or several of them must serve as a fulcrum, for the turned tooth. By this means, the pressure of the ligature is divided evenly in an entire circle, then, according to the laws of the mechanics, the tooth that serves as a fulcrum is pushed just as much out of its position, as the distorted tooth. Furthermore, the knotting of the ligatures is accomplished with difficulty and pain; they slide off easily and must be tied anew; they press down onto the roots of the teeth, separate the gums from the teeth, and allow the teeth to be lifted out of their cavities, making them loose, painful and easy to fall out.

The loosening of the teeth with the pelican is a very painful operation, and if one does not understand it, he is liable to cause the tooth to be broken or if successful in bringing the tooth to the desired position, it will probably not long remain there. I have tried both methods, have found them not suitable to my purpose and unworthy, therefore I had to reach my end by different means, where I had the opportunity of discovering other methods.

CHAPTER V.

NEW METHOD OF CORRECTING IRREGULARITIES OF THE TEETH.

My method of correcting irregularities of the teeth consists in the application of a spring of 14-carat gold, with a silver or gold crown. This method until now, entirely un-

known to others, and peculiar unto myself, is used when correcting the upper anterior teeth, by being applied to the lower front teeth. This appliance was made and applied in my own way, and to accomplish this the following instructions are necessary:

1. The form (impression) of the teeth and the alveolar portion is obtained by means of a wax composition, on which the metal appliance is allowed to lay.
2. This impression is then modeled in sulphur.
3. A model of plaster of paris is obtained from the sulphur model.
4. A model (die) of a metal composition, of the above mentioned parts of the jaws, is molded in the above plaster of paris mold.
5. Out of the same metal composition, a cover (counter die) is completed, and this constitutes the "stamper," the metal that is to be swaged is thus shaped therein.

The impression of the teeth described under number one is obtained by the use of a form (tray) of tin, horseshoe in shape, on the bow of which a handle is attached for the convenience of handling. (Plate VII, Fig. 38.) [Fig. 12.] A piece of wax paste is laid therein this wax composition is made as follows: Eleven and one-half ounces of yellow wax, $2\frac{1}{4}$ ounces of resin, $1\frac{1}{4}$ ounces of poppy oil, $\frac{1}{2}$ ounce of alkanna root, 1 scruple of bergemott oil, prepared scientifically. This wax paste is laid, according to length, thickness and breadth, over the eight to ten anterior teeth and continuing back to the remaining teeth included in the jaw.

In order that an impression of the teeth might be obtained, the impression tray, with the wax, is inverted, and placed so that the occlusal surfaces strike the center of the wax at every point. The mouth should not be opened too wide. Begin at one corner of the mouth, thus with an even pressure, press both arms of the tray with the index finger over the teeth and alveolar portion. To be sure that this is complete it is safer to press the overflow with the index finger, in order to obtain all of the alveolar portion.

When one is certain that the impression is complete, remove carefully the tray from the teeth; as a rule this presents little difficulty as the moisture of the teeth and gums prevents the wax parts from adhering.

Having thus obtained the impression of the teeth, the open ends may be closed by the addition of new wax. Then fill with sulphur, first stirring before pouring, and allow to cool and crystallize. This constitutes the sulphur model mentioned under number two. (Plate VII, Fig. 39.) [Fig. 12.]

As the sulphur model does not have the necessary hardness, over which a silver cap can be formed, it is necessary to make one of metal; consequently one of plaster of paris must first be obtained. To do this separate the sulphur model, which has been chilled, carefully from the wax impression. Fill in the hollows (air spaces) with wax paste and paint the whole with almond oil, in order that it may be more easily separated from the plaster impressions. A two-and-a-half inch strip of stiff paper is then laid around the base of the sulphur model with wire or thread. The space between the model and the paper is then filled in with the wax paste, in order to make it water tight. Then pour into this paper shell, and over the sulphur model, a mixture of plaster of paris and water, which has been stirred and has become a paste.

When the plaster has hardened and fully dried, this can be helped along by artificial warmth, remove the surrounding paper from the finished plaster model, and separate same carefully from the underlying sulphur model. With this plaster impression, number three, proceed as in the sulphur model, first placing a strip of paper as before described, and then pour into the plaster impression sufficient metal that has been melted. This metal composition consists of twelve parts of bismuth, three parts zinc and three parts lead. As this metal slowly cools and hardens, it cannot be removed from the plaster until approximately one-quarter of an hour has elapsed, and metal model number four is thus obtained.

A counterpart or cover, number five, in conjunction with this metal model, is necessary in order to complete this afore-mentioned "stamper." In order to do this, light a piece of pine wood, hold the metal model over the lighted flame, and allow a thin layer of soot to adhere over the outer surface of same. This will prevent the cover from adhering or becoming attached to the metal model.

Instead of coating the model with soot, the model can also be thinly coated with a paste of chalk and water, by means of a camel's hair brush, or with a thin separating fluid which oxidizes the metal. When this is done, the metal model is also surrounded with paper as in the plaster model, and pour into this sufficient of the above described melted metal composition, and complete the counterpart; this must not be removed however until fully cooled.

If it is desired to ascertain the size of the finished silver or golden appliance, take a piece of tin foil of the proper size, lay this on the metal die, place the counter die over same and by means of the hand, press a number of times; thus obtaining the foil crown. This is then smoothened, and from this a pattern of the necessary quantity of silver or gold leaf is cut. The latter is then laid in a like manner on the metal die, bend the cap to shape, and back into place. Drive this, by means of a hammer, into the redress of the counter die, pounding until this has been forced into place. The open ends are then rounded and contoured inward, so as not to touch the tongue or the lips. The above described appliance is then placed on the lower teeth, for example, like one puts on a hat, and allowed to touch the upper teeth that are irregular, and the patient bites on a piece of paper that has been laid between the back teeth, in order to determine where the pressure should be, and where the spring must be placed on the appliance. When this has been ascertained the gold spring is soldered on; this spring can be tempered, by hammering, when necessary. Then place the finished appliance (see Plate VII, Fig. 40) on the lower teeth

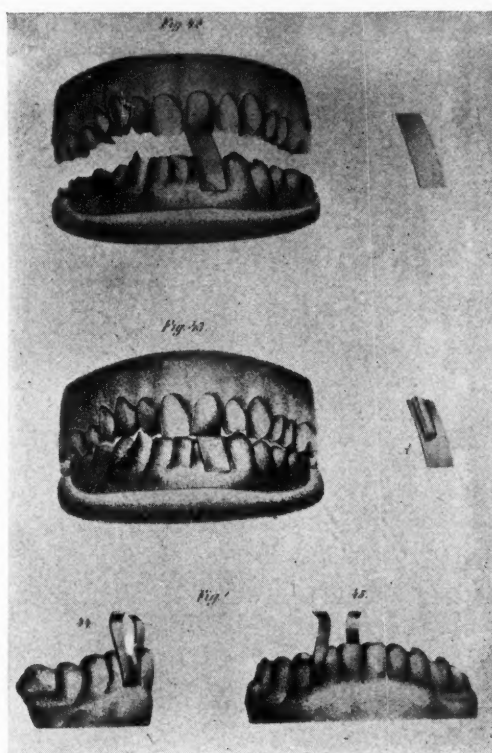


Fig. 13.

(Plate VII, Fig. 41). Allow the teeth to come together, and adjust the spring to such a position against the broad surface of the tooth, so that the irregular teeth may be moved in or out according to your desire. Then increase the pressure on the spring so as to prevent the teeth from coming together. (Plate VIII, Fig. 42). [Fig. 13.] When the spring is given the proper position and proper amount of pressure, and the application of the appliance is thus obtained, the patient is directed to keep the teeth closed as much as possible, so that the pressure of the spring against the teeth might work continuously, thereby allowing the object to be obtained as quickly as possible. Young children should also be directed particularly at night to apply a cap of linen, with ear laps, from the chin to the head, in order to force the lower jaw against the upper. Thus the mouth cannot be opened while the patient is asleep and the appliance cannot be moved or swallowed.

After the apparatus has been applied for twenty-four hours and the irregular teeth have been moved sufficiently from their wrong position, the spring no longer presses against the teeth, consequently the jaws can be brought together (Plate VIII, Fig. 43), which in the original they were unable to do. Therefore it is necessary every twenty-four hours

to readjust the spring until the teeth are in their proper position. This is done by bending or moving the spring, or by soldering on lengthwise a small additional strip. (Plate VIII, Fig. 43.) Thus additional strength and tension is obtained. The same method is followed in straightening the teeth in the lower jaw, with the only change that the appliance is adjusted to the teeth of the upper jaw. If there are several irregular teeth in the jaw to be straightened, it is advisable to proceed, one at a time, in regular order, thus making it possible to obtain a greater pressure in the proper direction than in endeavoring to straighten a number at one time. If the spacing between the teeth is very close and thereby hindering the correction and placing of a tooth in its proper place, use the file or extract one of the teeth, whichever is most feasible or aids towards beauty.

There are some dentists who do not consider the extraction of the much dreaded eye tooth as being necessary, on account of the absolute need of these teeth in holding the anterior ones in their position, their use as props, and as they prevent the adjoining back teeth from drifting forward and closing up the spaces. For these reasons, therefore, they cannot be spared. However, the eye tooth, if not extracted prevents the straightening and placing of the incisors teeth in their proper position, through their pressure against the incisors. This should be considered more essential than to allow these teeth (canines) to remain, as they may ultimately be lost through decay and caries.

Finally in order to straighten and place in proper position those teeth which have rotated, I use a cap with two springs placed in opposite directions. One for pressing the other for pushing the tooth into its position, this grasps the tooth as though in a fork-like vise, causing the tooth to be turned around. (Plate VIII, Figs. 44, 45.)

I recommend that during the entire time of treatment the patient should be kept quiet, should partake of food that is easily digested, preferably in liquid form, as soft mush, cold soups, comforts and the like. Cooling drinks, water with or without sugar, orangeade, lemonade, etc. In order that all food and drink may be indulged in, I also permit the removal of the appliance from the mouth.

In following the above described procedure, correcting the teeth, as a rule, should be accomplished in the following length of time:

- 1st. 8-9 years—6 days.
- 2nd. 9-10 years—12 days.
- 3rd. 10-13 years—36 days.
- 4th. 13-14 years—6-8 months.

Shearjashut Spooner, in his "*Guide to Sound Teeth*" (1836), says: "To remedy many cases of irregularities it is necessary to have recourse to gold or silver plates, or other mechanical contrivances. When the front teeth stand too far asunder, from natural conformation or from too early extraction of the temporary teeth, they may readily be brought so as to exert a gentle but continued pressure."

(To be continued.)

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

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THE NATURE OF THE X-RAY AND ITS DISCOVERY

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IN order to gain an intelligent conception of the x-ray it is quite necessary that the student start with a consideration of certain phases of electro-physics, and radiant energy, or in fact the very foundation of matter itself.

According to the most plausible theories and beliefs, all matter is suspended or contained in the medium known as ether, which is an elastic medium filling all space, interatomic and interelectronic, as well as all other space of which we have any knowledge.

Furthermore, many facts brought out by the close study of chemistry and physics seem to justify the belief that all substances of matter are composed of minute particles called molecules, and that each molecule is made up of two or more elements called atoms, while these atoms are also further divided in particles known as electrons.

These electrons or units of matter are never still, but are in a constant state of motion or vibration, each substance having its own specific atom and the electrons of such atoms having their own rate of vibration.

The vibration of these electrons produce disturbances in the ether known as "ether waves" which vary in length according to the rate at which electrons are vibrating. If the rate of vibration of the electrons be changed or disturbed, there is a change in the ether waves, resulting in a corresponding change in the phenomenon produced.

If this theory of matter is correct, as the evidence of modern science would lead us to believe, all matter then is made up of the same constituents, and its various forms are determined not by any essential difference of composition, but by the number, arrangement and amount of motion of the ultimate particles making up the atom.

All this has a practical significance to us in understanding the phenomenon which we call the x-ray. As stated before, it is known that a certain rate of vibration of electrons will produce other waves resulting in a definite phenomenon, while a change in this rate will produce an entirely different phenomenon. For instance, a slow rate of vibration (75,000,000 per second) produces what are

known as electro-magnetic waves. A little higher up the scale where the electrons are made to vibrate faster, heat waves appear. Another increase and light waves appear. If we continue to accelerate the rate of vibrations of the electrons, there will be produced successively ultra-violet or Finsen rays; then cathode or radium rays, and finally the x-ray.

It will then be seen that the x-rays are produced as the result of the most rapid rate of vibration of which we have any knowledge. In the laboratory this phenomenon is produced by the sudden stopping of a stream of rapidly moving free electrons in a vacuum tube which has been exhausted to one millionth of an atmosphere.

The x-ray therefore may be defined as that form of radiation which emanates

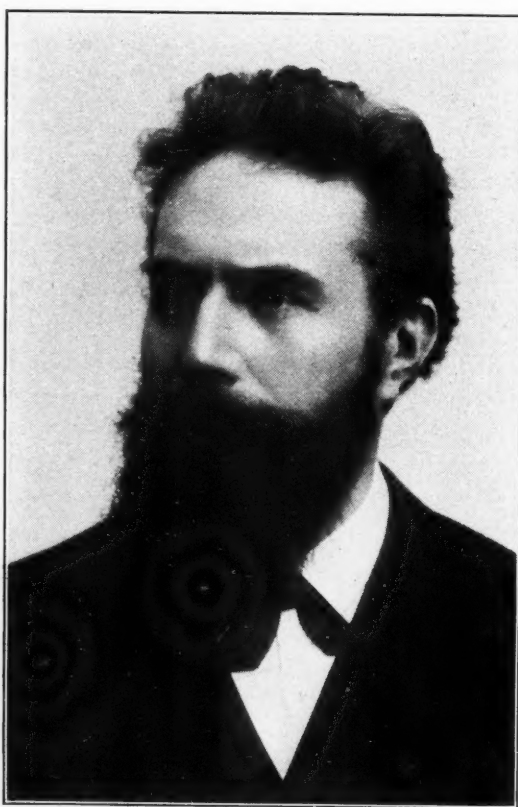


Fig. 1.—William Conrad Röntgen.

from a highly exhausted tube when an electric current of high tension is passed through the tube. The object of the vacuum tube is to establish a medium in which all source of resistance is removed, so that the electric current may excite the exquisitely rapid vibrations necessary to produce the phenomenon desired, the electric current being the source of excitation.

The radiation thus produced gives neither heat nor light, nor can it be deflected, reflected, or polarized. In fact, it can only be recognized by its effect upon the photographic plate and upon such chemicals as Willemite, Calcium, and Tungstate, which floresce or glow under its influence.

The x-ray was discovered in 1895 by William Conrad Röntgen, Professor of Physics, at the Royal University of Würzburg, in Germany. This discovery marking as it did a distinct epoch in the Science of Medicine, was received by the world with incredulity and amazement, for its reported possibilities savored almost of the occult. "A new ray had been discovered by means of which it was possible to look through opaque substances."

While it fell to the lot of Prof. Röntgen to make this discovery, there is no doubt but what other experimenters in the field of physics, unconsciously produced this same ray. In fact, its discovery was made possible by the work of other scientists who preceded Röntgen and laid the foundation for its advent.

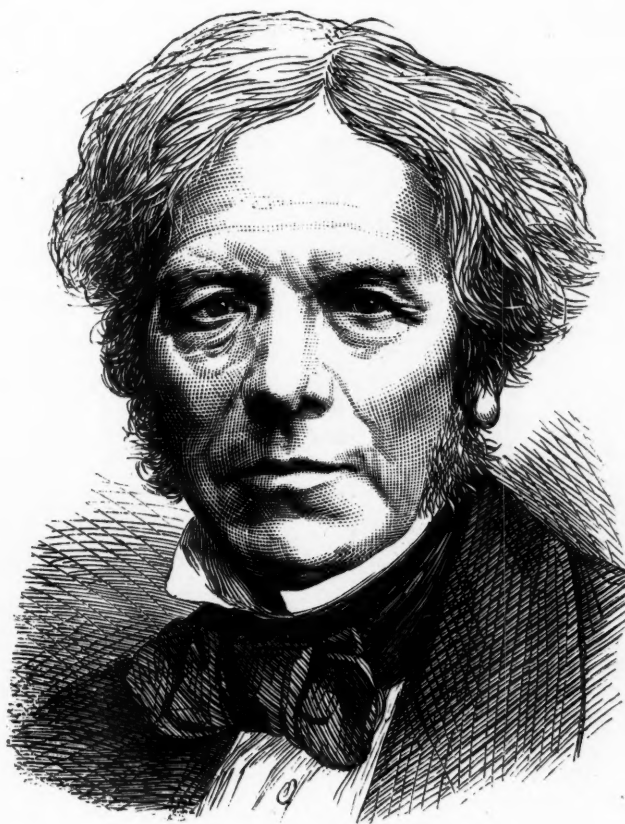


Fig. 2.—Michael Faraday.

Of these Michael Faraday was the pioneer. In 1831 he discovered electric magnetic induction, which made possible the induction coil and the other electrical machines utilized to generate currents of great potential. As early as 1838 he conducted a series of experiments to determine the effect of electrical discharges upon rarified gases, and invented the terms "anode" and "cathode" for positive and negative electrodes.

In 1858 Geissler constructed the first vacuum tubes and it was noted at this time that an electrical discharge passed through these tubes would produce a peculiar glow or phosphorescence, the coloring of which depended upon the character of the rarified gas contained in the tube. This phenomenon became known as "florescence."

A few years later (1860) Prof. Hittoff, a celebrated physicist of Munster, conceived the idea of exhausting the Geissler tube to a higher degree of vacuum and found as a result an increased resistance to the passing of the electrical discharge, and that the color of the rarified gases under florescence, varied with the degree of rarification. He also discovered another fact which was to have an important bearing upon the work of later experimenters, and that was that the luminous discharge in a Geissler tube, *could be deflected by a magnet*.

The important work of these early experimenters was followed later (1878) by Sir William Crookes, who succeeded in constructing a more perfect vacuum tube, that is, one which could be exhausted to a much higher degree of vacuum. With these improved tubes, Crookes discovered that with a sufficiently high vacuum the luminous glow within the tube disappeared, and demonstrated that within it there was a rectilinear radiation from the cathode, which he conceived

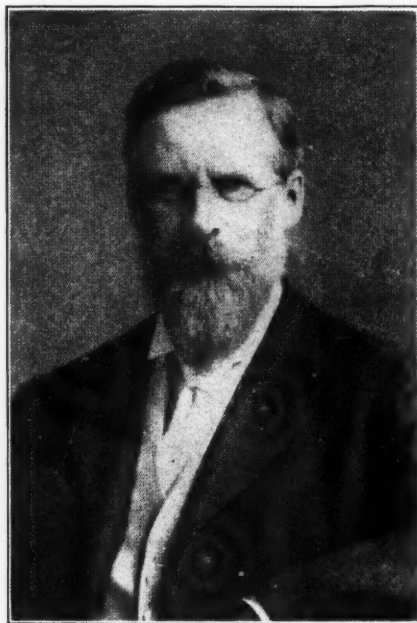


Fig. 3.—Sir William Crookes.

as being a projection of particles of highly attenuated gas at exceedingly high velocity. To this radiation he gave the name "Cathode Rays," and because of the peculiar behavior of gas in this exceedingly rarified state, he concluded that it was as different from gas in its properties as ordinary air or gas is different from a liquid. He found that the impact of the cathode rays against the wall of the tube would produce within it a greenish "phosphorescence" or "florescence" and an increase in temperature; also that these rays could be intercepted by metallic plates within the tube. By concentrating the rays at the focus of a concave cathode, he was able to produce a brilliant florescence and a very high temperature, both at the walls of the tube and in various substances within it. Without doubt, Sir William Crookes unconsciously produced the x-ray in the course of these experiments.

In 1892 Prof. Heinrich Hertz discovered that cathode rays would pene-

trate gold leaf and other thin sheets of metal placed within the tube. Soon after this discovery, Hertz died, and his experiments were continued by his assistant, Lenard, who was able to demonstrate that many of the phenomena of the cathode rays could be observed outside of the Crookes tube. By closing a vacuum tube at the end opposite the cathode with a thin sheet of aluminum, he demonstrated that a radiation proceeded through or from the aluminum walls of the tube which would pass through many substances opaque to ordinary light, and after passing through such substances, it would excite florescence in crystals of barium platino-cyanide, and would effect sensitive photographic plates in much the same manner as ordinary light. Lenard considered that all these phenomena were due to the cathode rays alone although in the light of our present knowledge, there is no doubt that not only in his experiments but in those of Crookes, Hertz, and other investigators, x-rays were produced. How-

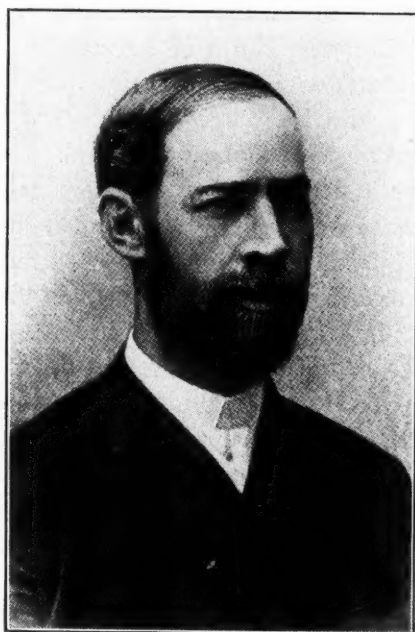


Fig. 4.--Heinrich Hertz.

ever, they were not recognized as such until 1895 when Prof. Röntgen startled the world by the announcement of his discovery.

Upon the memorable day of his discovery, Prof Röntgen was duplicating one of Lenard's experiments in the laboratory of the Würzburg University. The experiment consisted of passing an electric current through a Crookes tube covered with black cardboard, to test its florescence upon a piece of cardboard coated with barium platino-cyanide. A fresh specimen of this chemical had been prepared and spread upon the cardboard which was placed against the wall on the opposite side of the room to dry. The room was darkened and the current was passing through the tube, when to his amazement, Prof. Röntgen noticed that the chemically covered cardboard on the other side of the room was glowing with a wierd florescence. He approached the cardboard and in doing so passed between it and the Crookes tube, and beheld his shadow upon the card-

board. Picking up a book, he held it in front of the screen and noticed that it also cast a shadow. He then discovered that the luminous glow or florescence on the cardboard appeared and disappeared with the turning on and off of the current. With the tube operating, he picked up the cardboard and while examining it, noticed the shadow of his hand on its surface, the bones appearing much darker than the soft parts of the hand. He also found that the florescence was produced in the cardboard regardless of whether the chemically coated side was turned toward or away from the Crookes tube, showing that the rays had the power to penetrate substances at a distance from the tube.

Further investigation proved that the radiation producing these phenomena emanated from *the point of impact of the cathode rays* against the glass wall of the Crookes tube, that nearly all substances were transparent to it, although in widely different degrees, varying roughly with their density; that the radiation was rectilinear, that it could not be refracted, reflected, or deflected by a magnet. Hence it was plain to Röntgen that these rays were quite different from the cathode rays of Crookes, Hertz or Lenard.

Using photographic plates wrapped in black paper to protect them from ordinary light, he obtained with these new rays shadow pictures of metallic objects in a wooden box, and of the bones of the hand.

He continued his experiments both with the florescent screen and the photographic plate, and in December, 1895, communicated his discovery to the Physico-Medical Society of Würzburg. Being unable to determine the exact nature of this new ray other than classing the phenomenon as longitudinal vibrations of ether, Röntgen called it the x-ray, the letter x representing the unknown in the mathematical formula. Even today the exact nature of the rays has not been determined, although the concensus of opinion seems to be that they are violent ether pulses set up by the sudden stoppage of the cathode rays as they strike upon the walls of the tube or upon any intervening obstruction. If this theory be correct, x-rays are of the same general nature as light waves, but of such short wave length that they lie outside the visible spectrum.

Evidence—X-ray Pictures

X-RAY radiograph or shadow pictures are held admissible in evidence in the West Virginia case of *Griffith v. American Coal Co.* 84 S. E. 621, L.R.A. 1915F, 803, when shown to have been made with trustworthy instruments, and properly taken, in connection with the evidence of witnesses expert in the use of such instruments and skilled in making, reading and interpreting such pictures.—*The Medico-Legal Journal*.

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EDITORIALS

Orthodontia and Post-Graduate Instruction

THERE has never been a time in the history of the dental profession when so much attention was being given to post-graduate dental work as at present. The reason for this is that the profession has suddenly awakened to its responsibility and the dentists are trying to qualify themselves to meet that responsibility.

The medical profession has long recognized the value of post-graduate work, but it is only recently that the dental profession has considered that kind of instruction advisable. As a result a great many post-graduate courses are being offered on various subjects by different persons throughout the United States. We find that in some localities the dental profession is responding to post-graduate work with such enthusiasm that post-graduate clubs and post-graduate societies are being organized, the membership in some of these organizations being limited to men who have done post-graduate work.

The question of post-graduate instruction in the dental profession is at the present time somewhat of a problem, and courses are only in a developmental state. Among the first endeavors which we noticed of a post-graduate nature were the study clubs, which it is our impression were organized first in Iowa by men who took up certain lines of work under the tutelage of prominent men in the profession. The activities of these study clubs in Iowa had a very marked effect, for it seems that the dental profession in Iowa displayed greater interest in this subject than is manifested anywhere else by dentists in the United States. The plan adopted by these clubs could be followed advantageously by dentists in other parts of the country.

Another post-graduate effort was inaugurated by the Dental Society of Oklahoma, which for the past four years has followed the plan of conducting its state meetings along post-graduate lines. This has given rise to what is known as the "Oklahoma plan" and several other states have conducted meetings in a similar manner. Briefly, this plan is to have one or more men of national reputation deliver a series of lectures before the state society, whose meetings continue a week, and allowing the lecturers compensation for their work. The society members in addition to their regular state dues, are requested to pay a post-graduate fee, which covers the cost of post-graduate instruction. This plan has been remarkably successful, and the large proportion of dentists who attend the meeting in Oklahoma, which state has a comparatively small number of dentists, indicates that the profession is very much interested in the post-graduate idea. The Oklahoma plan was carried out on a larger scale at the Tristate Dental Meeting, which was held recently in Kansas City, made up of the societies of Kansas, Oklahoma, and Missouri, at which there were registered over fourteen hundred dentists, all of whom paid a special post-graduate fee in addition to their state dues for the special instruction.

We mention these two plans as methods by which post-graduate work can be given to the dental profession at a sum which will be comparatively small to the individual.

A third plan that has been followed by some instructors, is for the instructor to go to a town and organize a class for certain work for a stipulated sum. While there has been some objection to this plan for the reason that there may be a tendency on the part of some men to commercialize post-graduate instruction, we believe, however, that every man who has taken any of these post-graduate courses, regardless of the subject, feels that he has received greater value than can be estimated by the financial cost. If, therefore, the men who take such a course are satisfied that they have received what they paid for, we cannot imagine any good reason why anyone else should question the motive of the instructor in giving the course. While this may not be the most successful plan, which has been termed "barn storming" by those who are opposed to this method of post-graduate instruction, it has nevertheless accomplished a great amount of good, and we are inclined to believe such courses are not without benefit. It is not, however, our opinion that they are the ultimate solution of post-graduate instruction, or that they are the best plan of giving a course. We realize that some subjects in dentistry can be taught possibly in a few lectures—say, in a week by a class organized to take work in a certain locality—but there are other

subjects that require more elaborate preparation and more paraphernalia for teaching, and which cannot be successfully presented in such short time.

The fourth plan of post-graduate instruction has been the organization of post-graduate schools, which have been conducted in some localities for a number of years. These post-graduate schools, while they have probably been of considerable benefit to those who attended, have also had their objects misinterpreted by many persons, who are of the opinion that post-graduate schools are organized entirely for financial purposes and are money-makers for the men who are conducting them, and this opinion is emphasized by the fact that a large number of post-graduate schools have been established within the last few months for apparently no other object than to make money for the men who conducted these schools.

Among the first post-graduate schools was the Haskell School of Prosthetic Dentistry, which was organized by Dr. Haskell in Chicago a number of years ago and gave valuable instruction, but was not a financial success. Dr. Peeso organized the Peeso School for Crown and Bridge Work, which later affiliated with the University of Pennsylvania. This school also rendered good service, and was probably one of the greatest factors for the standardization of removable bridge work and for the perfection of bridge technic. In orthodontic post-graduate instruction the Angle School of Orthodontia was the first school to be organized, and probably as the result of its organization, the practice of orthodontia was advanced more than by any other effort. Some individuals criticised the Angle School and its methods, but the fact is that the majority of the graduates of that school were extremely successful; in fact, they were so successful that it became a desideratum among the dental profession to be known as an Angle graduate. That such distinction was coveted is proved by the action of a number of men in different parts of the country who posed as "Angle graduates" who had never been instructed in that school. This post-graduate instruction, like others that we have mentioned, was not a financial success. After being conducted a number of years, the school was discontinued, which suggested the necessity of some measures being provided by which, in the future, instruction of the character given in the Angle School could be acquired.

One of the objections to post-graduate courses in orthodontia was that they were limited to eight weeks, which some of the profession considered as too short a time. While we will admit that eight weeks is not sufficient in which to learn orthodontia, it must be borne in mind that we must deal with a condition, and not with an ideal. The orthodontic students in the past have been men of the dental profession who were depending upon their calling for a livelihood, and who were limited as to the amount of time they could devote to post-graduate work. In other words, the man who has an established practice, and who depends on that practice for a livelihood, cannot devote eight or nine months to a post-graduate course, as the financial sacrifice would be too great. In fact, most of the prospective students object even to an eight weeks' course, but they are not aware of the amount or character of work which must be covered in that time and they also object to the loss incurred by leaving their office for eight weeks. Experience has, however, shown that eight weeks is a logical compro-

mise. A longer time would be much better, but with the majority of students it would be impossible to attend for a longer period.

One of the problems which confronts the dental profession at the present time is that there is no standard for post-graduate instruction. Anyone who so desires can open a post-graduate dental school or give a post-graduate course, and there is no way to determine what the quality of the instructions may be. It is true, the American Society of Orthodontists at its meeting in Toronto had an education committee appointed by the president, Dr. Kemple, and the object of that committee is to inquire into the value of the contemplated post-graduate instruction, and to endeavor to standardize orthodontic instruction in dental schools. This committee has no legislative authority, and will be limited to making recommendations, which we hope it will do. If, however, recommendations are made that may be construed as a criticism of certain post-graduate schools, the members of the committee would lay themselves liable to possible damage suits, as the American Society of Orthodontists is not incorporated. It is to be hoped, however, that this committee will do something toward bringing order out of chaos, and that its effort will have a tendency to standardize post-graduate instruction.

Orthodontia and Process Patents

THE dental profession is quite familiar with process patents and the attitude which the majority of the members of the profession maintains in regard to those patents. Many members are cognizant of the trouble which some of the older practitioners had several years ago with a certain crown and tooth company and a certain rubber company over process patents, and are also aware of the controversy at the present time in regard to other process patents, but the relation of orthodontia to these patents has been greatly misunderstood by a large proportion of orthodontists. Up to the present time orthodontists have been free from annoyance regarding process patents, but we have no guarantee that they will continue to enjoy that freedom if the use of these patents becomes the rule in the dental profession. In other words, if the legality of certain process patents were to be established, there is no doubt in our mind that we would be affected by some of these patents covering certain phases of orthodontia.

Some practitioners claim there is no difference between process patents and device patents, but those who make that claim do so because they are in favor of process patents, or because they have failed to investigate the difference between the two kinds of patents. The patent attorneys recognize what are known as device patents and process patents. A device patent is one which protects the manufacturer of a certain article, which article can be placed on sale, and its use is unrestricted. The patent prohibits the manufacture and sale of that device by another manufacturer. A process patent is one which also may cover a device, but, in addition, contains a clause which prohibits the use of that device except in a manner described by the manufacturer. There is no question about the legality of either kind of these patents if, in case of doubt, such legality can be established in court. The dental and medical professions have not, however, been in favor of process patents, and the medical profession has been specially

opposed to device patents which cover any appliance used in healing or in relieving human suffering. The dental profession has never been opposed to device patents and we are now confronted with the proposition of paying enormous royalties to manufacturers who hold patents on certain instruments, which could be made and sold for about one-fourth of their present price if they were not protected by patents.

There are at present a large number of orthodontic appliances on the market that are covered by device patents. It may be admitted that one who, by his ingenuity, devises a certain practical appliance should be entitled to some kind of protection during a number of years, and that is the generally accepted opinion. Of the various orthodontic patents with which we are familiar we will refer to one that is a process patent. This patent covers the application of the alignment wire, and if process patents are established in the dental profession, the holders of this patent could prohibit the use of alignment wires unless they were made by their company. Also, if the legality of process patents should be established, a patent might be secured for taking a plaster impression or making a model, as one could not determine where the unscrupulous manufacturer or designer would stop in his efforts to obtain process patents.

There is also a patent that covers the gingival extension of the appliance for gripping below the convex portion of the tooth, which patent could be made applicable to almost any form of band or clamp that may be used in the practice of orthodontia.

For these reasons we believe that, as a matter of protection and principle, orthodontists should realize the possibility of the creation of a pernicious condition with which they may be confronted, and take steps to protect themselves by supporting legitimate organizations whose object is to investigate any patented article or process that may be obnoxious to the profession, and to especially guard against process patents.

The St. Louis Dental Society

ST. LOUIS enjoys the distinction of having one of the oldest dental societies in the world which is still in a very flourishing and prosperous condition, probably more so than at any time during its entire history.

In commemoration of this distinction, it will on November 16, 17 and 18 celebrate the sixtieth anniversary of its organization by the largest and most complete meeting ever held in the St. Louis district.

Sixty years in dentistry have witnessed many changes throughout the world, but during the vicissitudes of half a century this society has pursued the even tenor of its ways. If its original organizers were now permitted to look down upon the vista of years they would behold many changes. They would witness the struggle between the states in their own land, the rise of a small province in Germany with von Moltke and Bismarck as the guiding stars, deposing Napoleon III as the war lord of Europe. In science, then, contrast would be even more outstanding. From a one-year course in dentistry with no statehood to examine as to an applicant's qualifications as a dental practitioner, they would be

confronted with the present high entrance requirements, a four-year course, and a state board of dental examiners extending every effort not only to maintain a high standard but to constantly elevate the standard. Problems in dentistry that baffled all their efforts to master they would now see solved; diseases and conditions that thwarted all their efforts to overcome they would see yielding readily to treatment under modern therapeutic measures.

The St. Louis Dental Society has developed some of the brightest stars in dentistry, among whom might be mentioned H. J. B. McKellops who introduced the use of the mallet in dentistry before the Odontological Society of London in the year 1864. At the time of his death, April 23, 1901, he possessed the most complete and valuable dental library in the world. Other pioneers were Bowman, who is still in active practice, and Black.

In commendation of the work of the pioneers of this society its present members are planning to celebrate its 60th anniversary in a manner commensurate with its importance and historic interest. Papers will be read by some of the most prominent and able men in the dental profession. Many of the clinics will be of the popular club clinic idea and the modern idea will be carried out throughout the clinic plan.

Too much cannot be said in support of the progressive spirit shown by the dentists of St. Louis and the St. Louis Dental Society in launching what promises to be one of the largest and most interesting dental meetings ever held in the middle west. Not only has this meeting been supported in good will entirely, but we are advised that the members of the dental profession of St. Louis have amply financed this meeting by their own subscriptions assisted by the various dental supply houses. If there has been "anything wrong with dentistry in St. Louis" in the past, we are unable to see any present indications of such being true and feel that St. Louis is to be congratulated upon the tremendous efforts being made for their anniversary meeting.